AMERICAN GAS JOURNAL

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A Happy New Year

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Magic Chef

AMERICAN STOVE COMPANY

Magic Chef No. 204-0 Patented

Look for the RED WHEEL
When you buy a MAGIC CHEF

Magic Chef No. 1202-3 Patented

THE NEW
MAGIC CHEF MODELS
SERIES 1200 and 200

THESE beautiful Magic Chef Series offer to gas companies and dealers an unequalled sales opportunity.

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These new Magic Chef ranges come in various other attractive color combinations.

In the Series 1200 the cooking top is flush with the oven top to permit easy sliding back and forth of oven utensils. The cooking top section has a folding top buffet coverall to conceal grates when not in use. In Series 1200 a convenient drawer-type broiling compartment containing the famous Grid-Pan Broiler is a special feature.

Other Magic Chef features include the Magic Chef Non-Clog Burners, the Magic Chef High Burner Tray, the Magic Chef Automatic Top Lighter, fully insulated ovens, roomy service drawers and the famous Red Wheel Lorain Oven Regulator. Any range in these series equipped with Telechron Electric Time-Control Clock at extra cost if desired. Write for color illustrations and full description.

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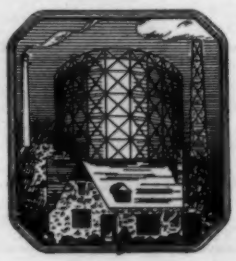

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WHOLE
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WE DO OUR PART

PUBLISHED MONTHLY BY
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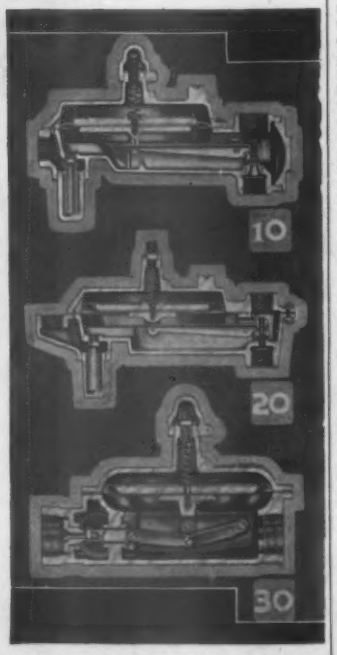
Reynolds Service Regulators are precision-built of quality material preinspected before manufacture. Each of the Service Regulators is built to fit individual requirements of particular types of installations. Like all of Reynolds products they are time tried in actual use. Write for detailed information, make use of Reynolds offer of co-operation in the working out of gas control problems.



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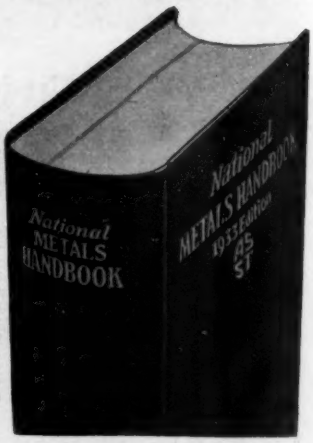
REYNOLDS GAS REGULATOR COMPANY

Anderson, Indiana, U. S. A.

GAS CONTROL SINCE 1892

HERE'S THE BOOK the World of Metals has been waiting for !



Once every three years, a new edition of the National Metals Handbook is announced by its publishers, the American Society for Steel Treating. Thousands of men who are interested in metals will welcome the news that the 1933 edition of this famous book is now ready!

The new National Metals Handbook contains 1453 pages of scientific data and authentic information on 231 ferrous and nonferrous subjects. This book is generally acknowledged as the supreme authority on all questions pertaining to metals. Widely used as a text and reference book by executives, superintendents, foremen, engineers, chemists, metallurgists, instructors and salesmen who have come to regard it as,

"The Blue Book of the Metal Industry"

National Metals Handbook
(1933 EDITION)
Completely revised - greatly enlarged - right up-to-date. 1453 pages, 4½x7, many illustrations, tables, graphs - - - - **$10**

The material in this new and greatly enlarged edition has been prepared by some 200 authors, men of unquestioned technical ability—leaders in their respective fields. Each of the 231 articles has been approved by the Recommended Practice Committee of the **American Society for Steel Treating**, publishers of the book. The following list of ferrous and nonferrous subjects included in the new Handbook indicates the widespread scope and impartial nature of this great work.

Partial List of Contents of New Edition

The **Ferrous Section** consists of 136 articles of approximately 900 pages. It includes 30 articles on Heat Treatment, 8 on Carburizing, 4 on Metallography, 13 on Testing and Inspecting, 13 on Steels and Alloying Elements, 8 on Chemical, Physical and Mechanical Properties of Steels and Iron Alloys, 6 on Forging, Mechanical Working, Fabrication and Processes, 7 on Melting, 7 on Fuels, Furnaces and Refractories, 12 on the Constitution of Iron Alloys besides numerous other topics such as Nitriding, Quenching, Pyrometry, Welding, etc.

The **Nonferrous Section** contains 92 articles of approximately 500 pages. This part of the book was prepared by the Committee on Data Sheets of the **Institute of Metals** division of the A.I.M.E. Included in this section there are 23 articles on **Aluminum**, 4 on **Brass**, 14 on **Copper Alloys**, 8 on **Lead**, 4 on **Magnesium**, 7 on **Nickel** and many others on **Tin**, **Zinc** and similar **Nonferrous** subjects.

The popularity of the National Metals Handbook, now in its sixth year, continues unabated. Read these enthusiastic comments by a few of its 25,000 users: **New York:** "The National Metals Handbook is a very potent factor in engineering and metallurgical calculations!" **Pittsburgh:** "The Handbook is a most valuable contribution to the work of the whole Metal Industry!" **Chicago:** "The Handbook is used by every man in our Laboratory dozens of times daily!" These unsolicited endorsements are your assurance that in sending for your copy of the new Handbook you are making a splendid investment which will yield generous dividends of increased knowledge and will equip you with a valuable tool for finding the right answer to any problem concerning the use of **Metals!**

SEND FOR YOUR COPY TODAY— MONEY BACK IF NOT SATISFIED!

ACCEPT THIS ON-APPROVAL OFFER

American Gas Journal
53 Park Place, New York

OK. Send me a copy of the new 1933 edition of the **National Metals Handbook**, as published by the American Society for Steel Treating and approved by its Recommended Practice Committee. Enclosed is check .... Money Order .... for $10.00. I understand that I may return the book any time within 10 days if I am not satisfied with it and my money will be promptly refunded.

Name .....

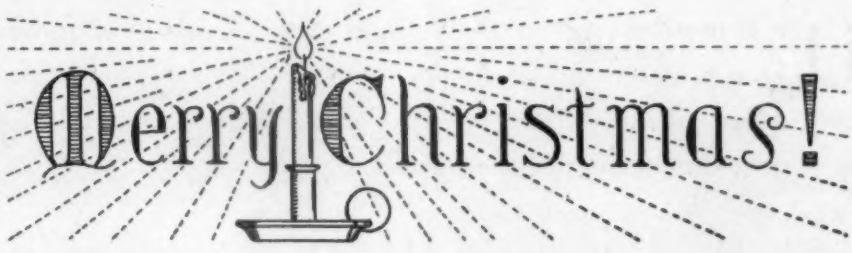
Address .....

City ..... **State** .....

Editorials

Shopping Suggestions

AS Christmas approaches gas companies rightly advise their customers to purchase ranges, refrigerators and other labor and money-saving appliances; in short, the practical aspect of the gift situation is stressed. But what of the gas man's purchases? Assuming that his salary has not suffered drastically during the depression, it is reasonable to suppose that he is tolerably well equipped with clothing, cravats, and other such necessities—merchandise which belongs essentially in the "practical gift" category.



Calling to mind an advertisement of a large department store at the very onstart of the present business muddle, wherein the reader was advised to buy "something you don't need," we are somewhat facetiously prompted to suggest that the gas man, during the process of unburdening his purse, follow a similar line of procedure—at least in part.

How about that Blackthorn cane you have been admiring in the haberdasher's for several fortnights? How well that leather-bound set of Thackery would look in the bookcase. What of that pedigreed Wire Fox Terrier Junior has been deviling you for for the past six months? Or give an extra thought to encasing daughter in the Coonskin coat she has had the fortitude to demand.

Every blessed one of the merchants handling such wares is a user of the gas company's service in his home—and ofttimes in his business. But aside from any other consideration, you will be putting money into circulation through divers channels.

Think this over in your happier moments—and don't forget a copious supply of Chistmas Seals; these come at the very top of the "practical" shopping list.

The Old Fight

ELSEWHERE in this issue will be found sound advice by The Copywriter as to the proper method of injecting a punch in our advertising, especially in the direction of speaking right out in meetin' anent misstatements of competitive fuels.

As we see it, we have been all too timid in combatting adverse claims of competitors and as a consequence it might well be that we are regarded as so many lumps of putty to be squeezed at will.

Even the customer likes a red blooded exposition of the merits of a commodity or service which he is using and applauds a well aimed blow that lands with a will above the belt. Of a verity, if we are ever to get anywhere, we will have to cease pulling our punches when we are in the right. Like foot-ball, business competition is not for the timid or thin skinned. And no one has much consideration for the player who quits the game with a minor bruise and whines to the effect that the opposition is pulling some dirty stuff.

Take the horse shoe from out your glove, measure your man and let fly, say we.

Let's Look Into This

FAR-SIGHTED merchants pay particular attention to the growing child as a future customer; as a consequence, they subtly, but none the less honestly, grasp every opportunity to apprise the next generation of the desirability of their wares and services. Possibly gas companies can profitably mull over the advantages of getting close to children between twelve and fifteen years of age.

Let us assume that a gas company would announce that a number of boys were to be invited to congregate in the company's main office where a lecture would be given by a competent person on handicraft. Let us further assume that the main talk would be preceded by a short but interesting chat on how gas is made and distributed, after which the handicraft chap would outline how a model gas plant or compressor station could be constructed at home. This, we believe, would literally pack them in.

To those exacting souls who might question what all this would have to do with gas, we would point out the work that is being done by numerous home service workers along the line of instructing the housewife in needlework and home decoration.

Cultivate them when young, and they will swear by and not at you when they are grown.

Henry M. Riley

Editor

BUDGET DAYS ARE HERE AGAIN

ONCE more must you give thought to the demands of another season of rebuilding, modernizing, replacement and expansion. More carefully than ever before will projects be scrutinized for thoroughness and indispensability.

SEMET-SOLVAY is called in each year by many engineering and operating executives to aid in working out budget requests for the next building season. We are better prepared than ever to serve in this important duty.

No project is too small—none too large—for this experienced organization.

There will be more construction work next year. When we plan it with you from the outset, we are best equipped to make the finished job exactly as it should be. Write us early about budget projects. We will cooperate to the utmost.

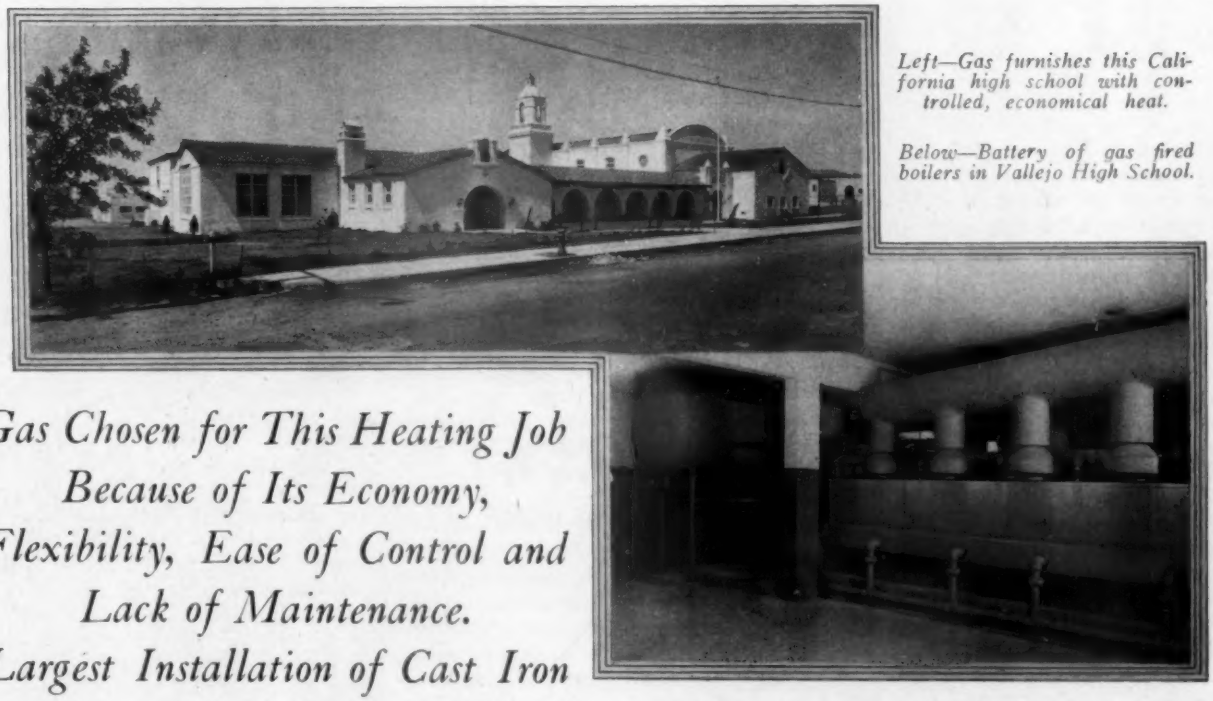
SEMET-SOLVAY ENGINEERING CORPORATION

Engineers • *Contractors*

40 RECTOR ST. • NEW YORK, N. Y.

AMERICAN GAS JOURNAL
December
1933

1933 Meets 1849 in California School



Left—Gas furnishes this California high school with controlled, economical heat.

Below—Battery of gas fired boilers in Vallejo High School.

Gas Chosen for This Heating Job Because of Its Economy, Flexibility, Ease of Control and Lack of Maintenance. Largest Installation of Cast Iron Gas Fired Sectional Boilers in This Country Is Described

By NINA McLEOD RITCH

WHEN the padres came to California, to weld the territory with a chain of missions from San Diego to the Valley of the Moon, the problem of heating had little or no place in their architectural scheme. Perhaps, even then, the climate was being publicized for its warmth and comparative freedom as a whole, from violent changes in temperature.

Warmth during the winter months, and comfort during hot summer days, were taken care of almost solely by thick adobe walls, and the peculiar qualities of crude tiles.

When the Board of Education of Vallejo, a city of 22,000 population, close to the most northernly link in the Mission chain, determined that their new Junior High School should incorporate as many of the Mission features as possible, the problem of heating proved of prime importance.

Modern children are not expected to undergo the rigors of monks, and, unlike the little Indian children who attended the original Mission schools, have not been accustomed to living through winters with scanty skin clothing.

Sprawling architecture, an auditorium with a seating capacity of 1,050, and wide, gracious hallways, assumed unusual importance because of their heating requirements. In addition, there were minor problems presented by two workshops, two gymnasiums, a large dining hall, smaller teachers' dining room and a large library. A total floor area of 80,000 square feet was involved.

Obviously, proper heating arrangements were of prime importance to Frederick H. Reimers, architect, who made the plans and specifications for the building, completed in August of this year. After conferring with C. D. Woodbury, mechanical engineer of the Robert L. St. John Co. of San Francisco, who assisted him in obtaining up-to-the-minute heating data, Reimers decided upon a steam heating plant of conventional design

so far as radiation and piping were concerned, but motivated by gas fired boilers. With the unusual requirements presented, the ordinary gas fired boiler was not believed to be competent. The final solution—two No. 46-S-5 Peerless Cast Iron Sectional Gas Fired Boilers—were supplied by the Eastern Foundry Co. of Boyerstown, Pa., through its representative, T. G. Arrowsmith in San Francisco.

Country's Largest Installation

The school's boilers are, according to Arrowsmith, "the largest installation of cast iron gas fired sectional boilers in the United States."

Final selection of gas boilers had come only after consideration of other types of boilers. According to Reimers, the architect, "We felt gas was a cleaner, more adaptable fuel, and became satisfied that the fuel cost would not exceed other types of fuel with a minimum mechanically operated burner, thus eliminating some degree of trouble."

The Peerless boilers supply the steam to 15,000 square feet of direct radiation and 5,500 square feet of indirect radiation, and also the equivalent of 4,000 square feet to take care of the domestic hot water when both the steam boilers are in operation. This makes a total of 24,600 square feet.

Either boiler can handle the entire heating load of the building, the other acting as an emergency boiler. During abnormal weather conditions, they can be used in combination. This plan will allow a considerable saving in service charges, as explained more fully, below, and will give better operating efficiency, as one boiler will take care of the heating requirements most of the time.

Each of the No. 46-S-5 boilers is 24 feet in length, 51¼" in height x 60½" in width. They are connected to a 10" steam heater, and operate on two pounds of steam pressure. Automatic controls are made possible by Time-O-Stat controls and low water cut outs, which, according to Arrowsmith, are regular standard equipment of the Peerless Gas Fired Boilers.

An American Gas Association rating of 32,000 and a B.t.u. input of 9,570,000 is given the two boilers, which represents a horsepower of 228.4.

In order to take care of the heating of domestic hot water during the period of time that the two large steam boilers are not in operation, a No. 6-S-5 Peerless boiler was installed. The American Gas Association rating of this boiler is 2080 and it has a B.t.u. input rating of 6250. It supplies 1,000 gallons of hot water, 60° rise per hour.

The condensation is handled by a Nash Electrically driven vacuum pump, making it a complete vacuum job. In the auditorium, it is necessary to use a Sturdevant Fan and a McQuade unit heater. An Independent Filter Company Kompak dry process air filter is used with this system. In the teachers' dining room, a Standard unit ventilator is used. McQuade unit heaters are used, too, for heating the carpentry and machine shops as well as the gymnasium. Ric-wil underground conduits are used between these units and the main building.

Piping was cared for by a two-pipe vacuum system with a Nash Engineering Company's vacuum heating pump. American Radiator Company's Corto pattern radiation was installed, and each radiator controlled by an Arco Radia-Therm automatic thermostat.

According to first reports following actual operation of the boilers, once the main burners are working, steam arrives in the radiators in approximately 14 minutes. One to one and one-half hours, depending upon the state of the weather, is required to heat the entire building comfortably for the morning session.

Efficiency Is High

Efficiency is high in the installed system. The three checks for safety, the electrical pilot, low water control and pressure controls, considered as a working team, do their job in a manner far superior to the best that could be done by a human being, even supposing that he worked 24 hours a day and that his attention never failed.

Interesting especially to the Vallejo school board and Elmer L. Cave, Superintendent of Schools, are several economy factors connected with the heating system: depreciation, repair cost to replace worn out parts, cost of operator's or engineer's time, and finally, but far from the least, the question of fuel costs.

The depreciation factor will undoubtedly be small. Gas is a clean fuel, failing to form soot or carbon, and requiring a dusting of the boilers but once per year; whereas, with a solid or liquid fuel, flue cleaning is a weekly matter. Absence of soot will, of course, mean absence of that prime enemy of metal—sulphuric acid.

According to Willard Howe, heating engineer of the Pacific Gas and Electric Company, the burners will last almost indefinitely. Too, gas requires no electrical motors, such as are necessary in an oil burner, and the amount of electricity used in the control system is so small as to be below the cost figure.

Repair costs will constitute a minimum, it is believed, for with no moving substances but the gas flame and the water and steam in the boiler, there can be but little wear.

Minimum Attention Required

"If an operator or building engineer can spend over five minutes per day on this gas designed and electrically controlled boiler room, we would say that something was wrong," said Howe. "The cost of operator's time is practically nothing. With oil, an engineer must spend considerable time cleaning up, seeing that oil pumps are working efficiently, lighting and turning off his oil burner, inspecting oil strainers, changing oil nozzles and cleaning flues. He must also check the quantity of oil in his tank and supervise the delivery of oil, as the oil tank wagon is sometimes prone to distribute oil on the lawn and sidewalk as well as into the tank."

Operating costs form an important item so far as the school board is concerned. Actually, the gas served to the boilers is cheaper than oil at 3 cents per gallon. Their investigation showed that oil would have to be delivered into the school tank at about 2.5 cents per gallon in order to break even with the cost of gas usage. In view of the fact that at the present writing, the usual cost for fuel oil in the Vallejo district is from 3.5 cents to 4 cents per gallon, the saving to the school was obvious. As a matter of fact, the special gas rate obtained for the building, will average about 30 cents per 1,000 cubic feet. Each burner consumes approximately 4,000 cubic feet per hour.

The special gas rate was obtained since the two boilers will rarely be in use at the same time. In California, consumer cost is based upon working equipment, and so the situation was handled easily by arrangements between the board of education and the P. G. & E.

The heating equipment was installed by Carpenter and Mendenhall of Sacramento, California, and according to Arrowsmith, much credit should be accorded the workmanlike manner in which they did their job. When installation was completed, only a few minor adjustments had to be made, and the result has met with the approval of the school

(Continued on page 49)

Gas In Review

If You Enjoy Competitive Advertising "In The Raw", so to Speak, You Will Revel in the Author's Commentaries on the Virtue of Letting Fly from the Shoulder with a Will and Not Pulling Punches.

By THE COPY WRITER

GAS company advertising has found a voice. It's speaking up—sometimes even to the point of belligerency. And that is one of the cheering signs that the gas industry is alive and kicking back, at least in its vital parts, which are the principal operating gas utilities of the country.

The reading, and therefore the buying, public reacts favorably to large gestures, even if these sometimes slip and strike the nearest competitor in the eye. In fact, there have been cases in which advertising history has been made by competing concerns who deliberately signed articles for a fifteen-round fight without gloves on the wholly justified theory that thousands would pay money for the sake of seeing a little action, while less than a handful might respond to the time-worn specifications of lonely solicitors.

There was a martial note at some of the sales sessions in Chicago during the late Century - of - Progress convention of the American Gas Association, commencing with Mr. E. M. Sharp's excellent slogan, "Gas Doesn't Cost—It Pays." This note appears in much of the gas advertising that has recently come to my desk. It indicates to my mind a genuine trend toward directness, towards meeting the issue at hand. I have sometimes suspected that, in the past, executives who were responsible for approving the output of their advertising departments wielded a well-worn rubber stamp bearing the words, "At any rate, it's safe." With few exceptions this is no longer true.

I have in mind such advertising as the Detroit Gas Company's *"Why Experiment"* campaign which is meeting the challenge of electric cooking in that city. The copy: "Why subject yourself to the increased operating costs, the more sluggish performance, and the cooking uncertainties of a fuel with which you are unfamiliar, when gas, the 'proven fuel,' is already in your home"? Of course, the company might pretend they were talking about kerosene or coal. But I don't believe anybody would be fooled. The conclusion follows forcefully in a later piece of copy: *"No! I won't experiment—I'll stick* to Gas!" And finally, *"I'm Glad I Didn't Experiment*—Gas Cooks Better . . . Costs Less."

BEAUTY grows
in leisure moments
while her gas range
gets the dinner
It takes time to be beautiful. Time to bathe, to use creams and powders, comb and brush, to dress with care. Time to let rest and relaxation iron out the traces of work and worry.
TIME to be beautiful—it's always time to be beautiful. And there is always extra time in the home with the all-gas automatic kitchen, the kitchen that thinks and works for you while you are out of it.
The newest gas ranges, for instance, will cook an entire meal without attention. Put the dinner in the oven, set the time and temperature controls, and the range does the rest! Special menus, hundreds of them, have been prepared for this kind of cooking, menus for meals that are delicious, tasty and wholesome, meals that give you hours of leisure.
These new gas ranges are inexpensive to buy and operate, like other gas appliances in the modern kitchen. Visit the nearest gas office; discover how much gas can add to your life when used in modern ways.
ICED IN SILENCE
Gas refrigerators are not merely quiet but absolutely silent, for the heat from a tiny gas flame makes ice without a sound. They are cooled entirely by air. For the most economical refrigeration, use gas.
PLENTY OF HOT WATER
Automatic gas water heaters provide hot water at the turn of a faucet. Many have tanks of rustless Monel Metal, which will outlast your house and always provide sparkling, clear hot water.
THE GAS COMPANIES
OF GREATER BOSTON
A New Angle In Gas Advertising.

An added element has barged into the cost advertising of the Union Gas & Electric Company. It hits the bull's-eye with a double-barrelled charge. It cuts corners to the heart of the subject. Simply this: "Gas Service Costs Little. Make it cost still less by using modern efficient appliances." An argument with demonstration value that also does its part in improving public relations and in meeting high bill complaints.

Then the consolidated Gas Company with its house-heating copy "Stop All This Bother of Storing Fuel," hitting the oil man in one of his vulnerable spots. Arguing from this premise one is justified in saying that gas is the only truly automatic fuel. This is just a few steps away — not too many, let us hope — from direct attack on such exaggerated claims as the statement that a certain type of oil burner is more efficient because it burns "95 per cent air and only 5 per cent fuel." It is one thing to say that such misstatements react against the advertiser. But it seems (to this writer, at least) that gas company advertising has a duty to perform in keeping many gullible souls from investing their money in disappointments and in hopes deferred.

Directness in gas advertising copy is aimed at a corresponding directness of consumer demand. Under the new dispensation, the public is feeling its oats, so that today it not only knows what it wants, but also expects fully to get it. Two pieces of copy from the Washington Gas Light Company illustrate this point—one with the headline, "I Want 50 Gallons of Hot Water a Day . . . and the cost cannot exceed three dollars a month"; the other, a range advertisement that offers "A Complete New Deal for the Forgotten Kitchen." The rest of the copy is equally specific—in one case, water heating with limited input; in the other, a "whole new system of cooking by gas."

Those are just a few outstanding examples of "direct" advertising in its newest and most encouraging sense. Apart from directness, however, I am always interested in advertising which lifts itself out of the mass, no matter by what device or method that result is achieved. We can learn by watching others—even those, often, entirely outside of the gas business. Take, for example, this latest institutional copy of the Gruen Watch Company in national magazines.

Surely, you must have noticed the all-too-frequent clumsiness of the institutional "message" that points with pride to—shall we say a customer's letter of commendation?—at the same time trying to affect a modesty that it cannot possibly feel. The next time you are faced with that trying predicament, Mr. Advertising Man, try remembering this exactly-right approach of the Gruen Company's headline writer: "We Are Human Enough to Feel Pleased." Every word weighed for its value. The result? Well, what do you think?

The Milwaukee Gas Light Company makes a "special" out of an item that was reprinted in the centennial anniversary edition of the New York *Sun* a couple of months ago. The item goes back to 1835 when, history tells us, gas was generally used only for lighting; but the *Sun* of that date reported:

" . . . a very beautiful experiment in cookery by gas was performed. . . . A fine leg of mutton was placed under a tin pyramidal cover, open at the top, and beneath it a horizontal circle of burners. . . . The mutton was thus cooked through in less than half an hour . . . without burning . . . with, in fact, a purer flavor of the meat than by any other mode."

Milwaukee adds, "Today . . . Gas Is Still Best." Nuff said! Unfortunately, the copy writer decided to labor the point for a hundred unnecessary words more.

Meanwhile, the Gas Companies of Greater Boston (a regional campaign) are growing sexy with a vengeance. We thought when the first proofs of undressed ladies came along that this was simply a logical development of the bathroom appeal made famous by the soap people and successfully applied in this instance to automatic water heating. Now, however, they are on the subject of gas ranges, and the attractive model featured by the illustrator (who knows his stuff!) is still appearing in her scanties. The headline writer remembers to remind us that "Beauty Grows in Leisure

(Continued on page 13)

WHY
experiment?
WHEN it costs you money to find out that you can't get any better method of cooking than you now have, providing you are now using gas in your kitchen.
You know what gas will do for you. With it, food is quickly and easily prepared—better results are obtained. Gas meets every cooking need—instantaneous heat, easily controlled, slow or fast—baking and roasting—better broiling—in fact, there's nothing that quite equals all-around gas cooking.
So we publish this advertisement urging that you investigate carefully before you make any changes, for the sake of your own convenience, comfort and pocketbook. Many householders who have tried other methods have come back to gas cooking as the only satisfactory means of easily and economically providing properly prepared food for their families.
Why experiment when such an experiment will not give you anywhere near the service which you now have?
DETROIT CITY GAS CO.
Clifford at Bagley
Phone CHerry 3500
Branches:
Boulevard—General Motors Bldg.
Hamtramck—11601 Joseph Campau
Branches:
Wyandotte—3013 Biddle Avenue
Dearborn—22113 Michigan Ave.
GAS
cooks better··costs less

Cautioning Against Experimenting.

How Frequently Should Gas Househeating Be Advertised?

A Year Around Job Should Be Carried Out, Featuring Househeating at the Four Seasons of the Year. This Procedure Is Based Upon the Advertising Reactions of the Average Customer

By STUART BRATESMAN

Manager, Display Department, Boston Consolidated Gas Company

IS advertising automatic gas house-heating a year 'round job, or should the gas company concentrate on the fall months for special publicity and let the subject slide during the rest of the year? What's your answer? Here's the writer's, —to successfully sell this effortless service the gas company should map out a program of advertising that will bring this subject to the public's attention at regular intervals, throughout the entire year. And we'll give our reasons.

Suppose we take a window display program as an example. Reproduced on these pages are four window advertisements of a series used by an eastern gas company during the past twelve months. The series started about this time last year with the display entitled, "Next Spring." Now,—old-fashioned advertising ideas on gas house heating specified a concentration on the subject during September and October. Such a program only half tells the story to a limited number of people. There are so many seasons of the year in which a "frame of mind" exists regarding heating methods that a fall campaign is limited to only one attitude on the part of the reader. The writer is a great believer in applying the human

NEXT SPRING
WHEN THE HOUSECLEANING HAS TO BE DONE YOU WILL APPRECIATE THE VALUE OF HEATING YOUR HOME WITH GAS BECAUSE IT IS ABSOLUTELY CLEAN
NO SOOT-NO DUST-NO SMOKE

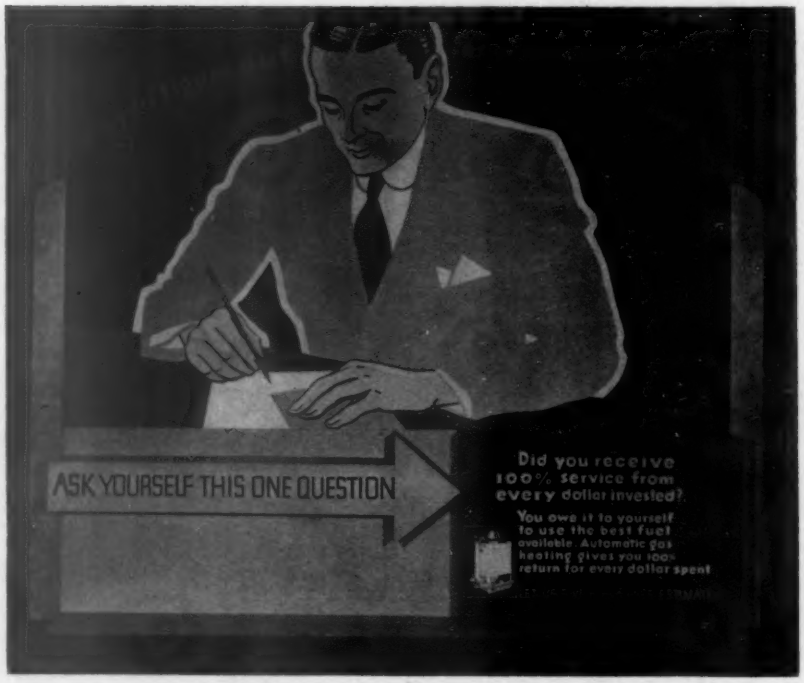
Customer Is Advised of Spring Cleaning Problems.

reactions of the average person to advertising. Don't forget that psychology enters into the preparation of window displays and printed advertising in a big way. Our job is not so much to sell the actual heating equipment, strange as it might seem to the reader, but to sell the service the equipment gives the buyer,— the effortless operation, cleanliness and efficient operation. How can we reach the public with these thoughts? We offer the four displays shown on these pages as examples of reaching the passerby with selling ideas based on certain reaction of seeing thoughts reproduced that the reader might have in his own mind at the very same moment.

Sure-Fire Attention Getters

The two window advertisements designed around the housecleaning angle are sure-fire attention-getters. Women will stop and read them, as well as men, and when they see the gas company taking their side of the spring housecleaning problem it usually means a boost for gas heating direct from the housewife herself. Enlisting the homemaker's support is not the worst way of selling automatic gas heating. As previously mentioned, the series started with the ad entitled, "Next Spring." This was used in the fall.

Next, came the display entitled, "Do You Wake Up To Heating Worries?" This advertisement was used during the middle of winter. It attempts to approach the reader in a human manner, that is, the average "fireman" is usually pretty well fed-up with the rigors of hand-firing a furnace by this time and such a thought is quickly read and understood by this "frame of mind" passerby. This is what we mean by appealing to a person's human reaction. It stops them every time.


ASK YOURSELF THIS ONE QUESTION
Did you receive 100% service from every dollar invested?
You owe it to yourself to use the best fuel available. Automatic gas heating gives you 100% return for every dollar spent

Presenting a Timely Question

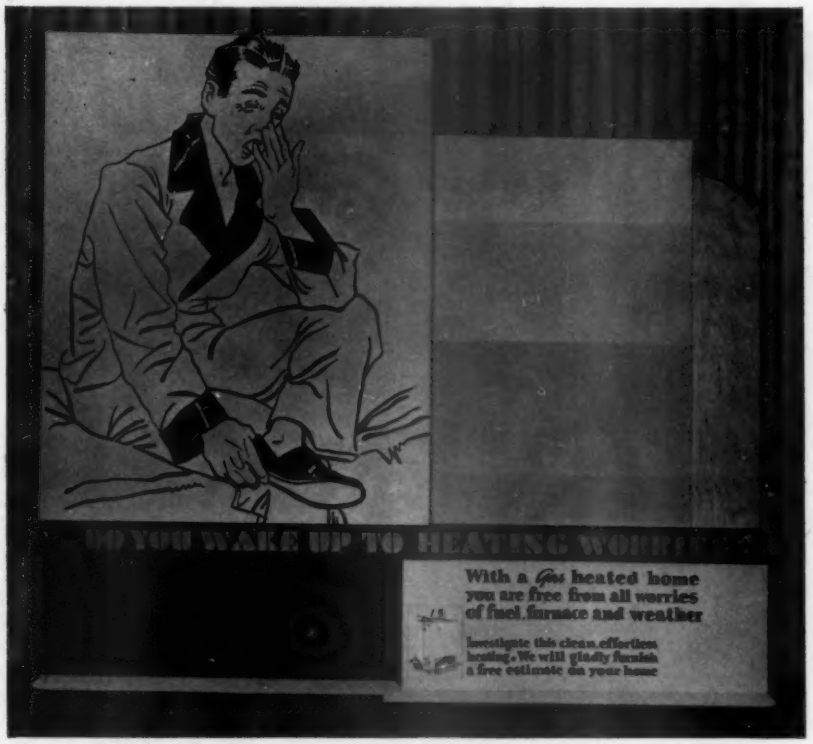
Along in the spring months the other housecleaning display was used, as a reminder of the woman's angle. It was directed at the man of the house and was calculated to arrest the attention of the average couple as they passed the window. Just imagine a wife stopping and drawing her husband's attention to the line "Consider Your Wife . . ." From personal observations this little scene happened dozens of times.

During the summer months people like to forget the inconveniences of the past winter's heating routine. Right here is where the gas company can "get-in" a lot of effective advertising on the benefits of gas heating. Most "basement nomads" are all worn out by the dirt and bother of seven or eight months of endless toil. There's nothing like "striking while the iron is hot." This summer type of heating display, shown in the advertisement entitled, "As You Figure Out Last Winter's Heating . . . ," completes the year 'round picture.

An Appeal to the Husband.

Appliances Not Featured

One other thing: you'll notice that in none of these displays do the actual boilers appear. In their place we use a small reproduction of the unit, colorfully mounted and framed. In selling a service of this type, the reader is not so much interested in what the equipment looks like as what it will do over a period of



This One Should Interest Many Non-Gas House Heating Folks.

years. But, to satisfy whatever curiosity he might have, we show him a small picture of the heating unit.

From this brief explanation the reader will see that a lot of valuable publicity is lost in not carrying house heating advertising through the entire year. Try it during the next year and see for yourself.

Gas In Review

(Continued from page 10)

Moments While Her Gas Gets the Dinner."

Personally, I am old enough to remember when the demand was to "put romance into the gas business." It probably serves us right that the answer should finally come out of conservative New England. Up there, at any rate, they have the courage of their convictions.

Courage is a great asset in all advertising. Going back to Detroit, for a moment, I would like to pin a *croix de guerre* on the advertising man who conceived (and on the advertising executive who approved) a recent 40-inch announcement entitled "The Truth About Shrinkage in Meat Roasts."

Those visitors to the Century of Progress who got as far as the Federal Building (more power to them) may have noticed the impressive exhibit and demonstration which was staged by the Bureau of Home Economics. Part of the exhibit was concerned with the important subject of meat shrinkage in cooking. It seems that there is a right and a wrong way to cook a roast. In fact, there are several wrong ways. But there is only one right way, and it was the purpose of this highly instructive exhibition to show the public how they could save money on their meat bill by—well, ask your home service director. The point that was interesting to me, and which should be of interest to all gas men, is the fact that this entire demonstration—the good way as well as the bad—was performed on a modern-type gas range. That, if it means anything at all, was official recognition that there is no basis to the claim of certain interests that gas fuel is inherently wasteful in this regard, or that some other source of heat has any advantage over gas in preventing the shrinkage of meat. It is the opinion of the writer that this entire demonstration should be duplicated, actually and in advertising, by every gas company throughout the country wherever electric competition raises its head.

Detroit has approached the subject without flinching, even to the point of mentioning the "glowing wire" method of cooking by name. Its advertising is factual and convincing when it says: "Oven temperature and length of cooking time are the principal determining factors—in combination with a number of secondary factors such as (1) kind and cut of meat; (2) amount of fat; (3) degree to which it is cooked. You or any other competent cook know that shrinkage is not governed by the *kind of fuel used,* but rather by the character of the roast itself, and the manner in which it is cooked."

Going the Competitor One Better

Then it goes its presumptuous competitor one better by asserting that "the modern gas oven, with its accurately controlled heat (many times more accurate than with 'glowing wire' cooking) and with its quick, searing heat for starting, gives you more roasting advantages and results in finer appearance and flavor than are obtainable with any other so-called modern method of cooking."

That is what I call "calling your shots."

As a parting shot of my own, I would like to call attention to a new stunt in house heating copy that has been adopted by one of our Imperial brothers, the British Columbia Electric Railway Company, which, in spite of its name, is also in the gas business. Don't blink when you see the headline: "20,000 to 50,000 Cubic Feet of Gas Given FREE To Every Purchaser!"

Well, it's just a new twist to an old story, driving home the fact that Vancouver has a special low rate for gas heating customers. The difference between the domestic rate and the special heating rate is equivalent to the average amount represented by the figures stated above. As the advertisement says, "We give you free gas, varying with size of furnace installed, equivalent to an average use for two months."

I am not a rate expert, so I cannot testify as to the regularity of this procedure.

Distribution of Sulphur in Purifiers

In Studying the Manner in Which the Foul Gas Seeks Its Path Through the Purifier Boxes, It Is Concluded That There Must Be Considerable Differences of Temperature in the Iron Oxide Mass of the Various Layers and within Each Layer in the Purifier Box

By W. ZWEIG *and* F. KOSSENDEY

Das Gas und Wasserfach, volume 76, 1933, pages 644 to 648

THESE investigations and experiments were undertaken for the purpose of obtaining a clearer conception of the manner in which the foul gas seeks its path through the purifier boxes. Answers were sought to the questions, whether the gas follows any predetermined path through the boxes, whether the distribution of sulfur in the various layers of oxide in the boxes varied and also whether it is possible to direct the flow of foul gas through the purifiers as desired, so that the time during which a box could be kept in operation might be substantially increased.

Three Experimental Boxes

The purification of the foul gas and the removal of sulfuretted hydrogen, ammonia, nitrogen oxides, tar and wash oil mist, as well as other impurities, was carried out in three purifier boxes connected in series, each box having the dimensions 8 by 10 by 2 meters and having a cubic capacity of 160 cubic meters (56000 cubic feet). A fourth box of the same dimensions was used as reserve. The boxes were located in the open and were each provided with four wooden gratings. The covers were made with rubber packing. The arched covers were provided with a layer of cork and asphalt in order to reduce radiation of heat as far as possible and prevent the disturbing formation of conden-

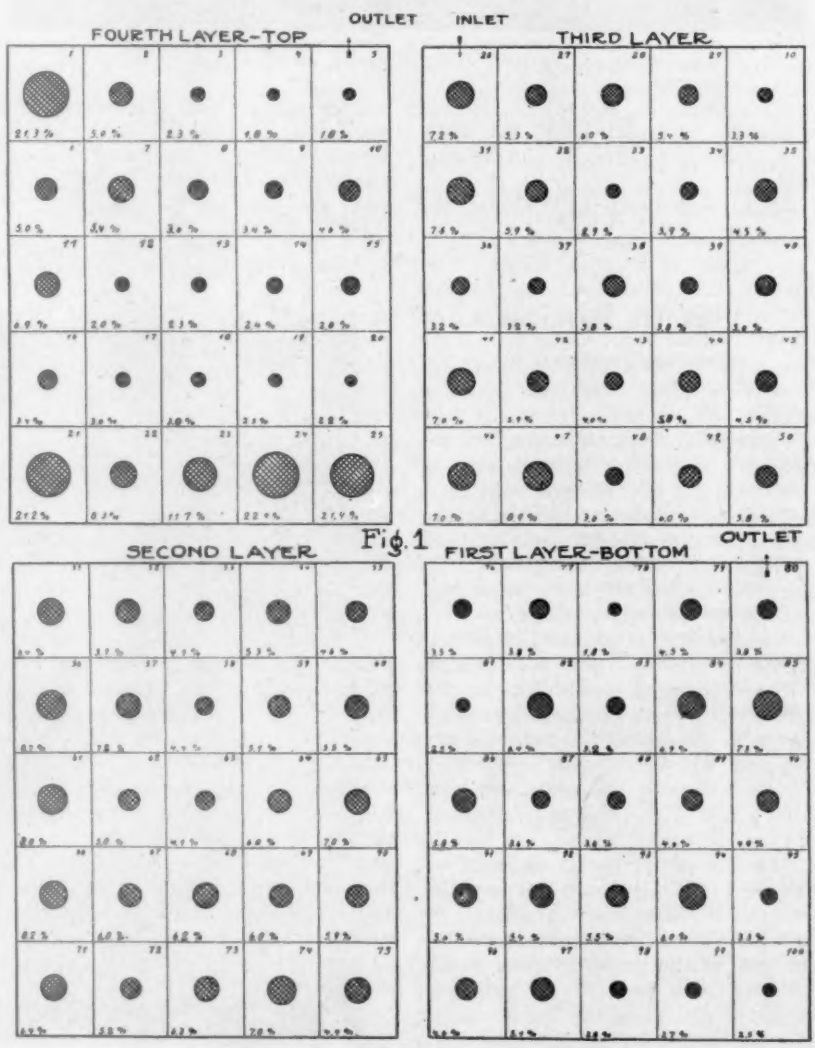


Fig. 1

sate within the topmost layer of oxide. The ports for the entrance as well as the exit of the gas were located on the same side of all the boxes. The inlet port was arranged between the second and third layers of oxide and the outlet ports below and above the first and fourth layers of oxide. It was not possible to reverse the flow of gas in these purifiers and neither could the inlet and outlet ports for the gas be interchanged.

The spent oxide was regenerated in the boxes themselves. The air, which was required for this purpose, was furnished by a compressor provided with a return-flow pipe. The maximum delivery of compressed air from this compressor was approximately 90 cubic meters per hour (3150 cubic feet per hour). The air pressure at the outlet from the compressor was maintained at a constant height of 75 millimeters of mercury (three inches). The compressed air pipe from the compressor was two inches in diameter and decreased to one inch diameter. Steam connections, provided with suitable valve controls, were provided for blowing steam into the boxes but were not used, since the formation of condensate in the topmost layer of the iron oxide, which was mentioned above, would have been increased by such procedure.

Instruments Freely Used

Measuring instruments were provided for continuous control of the pressure and the temperature of the gas in the separate boxes as well as devices for removing samples of the gas, these being located in the covers and at outlet ports for the purified gas from the boxes, so that the proportion of sulfuretted hydrogen in the gas could be determined both qualitatively and quantitatively. The average speed of flow of gas within the boxes was on the average 8.7 millimeters per second (0.348 inch) against a maximum of 14.5 millimeters (0.58 inch) and a minimum of 2.9 millimeters per second (0.116 inch), through a cross-sectional box area of 80 square meters (880 square feet) and a total gas flow of 60,000 cubic meters per 24 hours (2,100,000 cubic feet).

A mixture of Lux mass and swamp ore, in the ratio 80:20, was made in a special machine for turning over the mass. (Any suitable device may be used for this purpose.—EDITOR.) The boxes were filled with the mixed iron oxide by means of a mechanical loading device. The oxide mass contained 52 per cent of water; its bulk was 800 kilograms per cubic meter (about 50 pounds per cubic foot). The bulk of the Lux mass was 818 kilograms per cubic meter (about 51 pounds per cubic foot) and that of the swamp are 726 kilograms per cubic meter (about 45.6 pounds per cubic foot). The physical constitution of the two products varies very considerably. This fact can be gleaned from a comparison of the screen analysis of the air-dried substances as shown in the following tabulation:

Granulation in mm.	Lux Mass	Swamp Ore
0 to 1	65.2%	47.0%
1 to 2	10.9%	15.8%
2 to 3	8.7%	14.8%
3 to 5	5.9%	11.1%
5 to 7	2.2%	3.8%
7 to 8	1.6%	1.5%
8 to 13	2.7%	3.2%
greater than 13	2.8%	2.8%

One fact which is especially clear from these figures is that the Lux mass contains substantially finer granules less than one millimeter in size than swamp ore. The spent oxide is regenerated, as has been mentioned above, in the boxes by blowing a constant quantity of air (1.5 per cent) through the inlet of the first purifier in the system. The total operating period of a box is fourteen months under some conditions, during which period this box was first used in the third position, then in the second and finally in the first. The box was removed from the installation when its efficiency fell to forty per cent. The pressure of the flowing gas at the inlet to the purifier installation amounted to 300 millimeters (12 inches) of water on an average, and the total loss of pressure through the boxes amounted to 60 millimeters (2.4 inches). The spent oxide was ground in roll mills, spread out on the ground in a suitable building, turned over by machines and, after complete dry regeneration, re-used.

Data Schedule

Operating control consisted of hourly determinations of the gas pressure at the inlet to the boxes and temperature measurements of the gas pressure at the outlet after purification was completed. At a certain definite time each day the efficiency of the individual purifiers was determined. Distribution of the heat and temperature within any box in operation could not be established due to lack of suitable measuring instruments.

Control of the oxygen content of the manufactured gas is also a factor in obtaining comprehensive regulation of all the conditions which affect the purification of the gas. Even though the air added to the gas during the manufacturing operations remains constant, considerable variation in the oxygen content of the gas takes place due to variations in the composition of the coal mixture used and the varying yield of gas occasioned thereby. Finally care must be taken to see that the temperature and therewith the moisture of the gas flowing into the first purifier box vary within normal limits.

Numerous tests were made to determine the manner in which the sulfur, recovered from the foul gas, is distributed throughout the total cross-section of a box. A detailed account of these tests and their results follows:

Samples of the iron oxide mass were taken in such a manner that good average mixtures were obtained from 25 separate sections, each being 2 x 1.6 meters in area. These samples were taken from each layer of oxide in the boxes and were kept in tightly-closed glass bottles.

Analysis of Results

The samples were examined by the conventional method which was developed by Knublauch (Zeitschrift fuer angewandte Chemie, 1918, pages 45 to 46.). The percentages of water and of sulfur in the various samples are shown in figures 1 and 2.

A critical examination of these results reveals, first that certain sections in the corners of the boxes and particularly in the topmost layer of oxide contain comparatively high contents of water and low contents of sulfur. It was found for example in the sections 1, 21, 24 and 25, that the water content of the iron oxide mass was approximately six times greater than the average water content of the purifier mass in the other sections of the fourth layer. The results indicate the direction which the foul gas takes through the mass. The conclusion must be reached that a round purifier box would be better suited for purifying gas than the usual right-angled box.

It was further indicated that the centrally-located sections in the topmost layer of iron oxide were on the average drier than the sections at the sides of the boxes. The conclusion is reached that the temperature in the centrally-located sections must have been rather appreciably higher than that in the sections at the edges of the box. The same phenomenon was observed in the third layer of oxide, although not to so marked a degree. While the difference between the water content of the oxide in the sections located at the sides of the

box and that of the oxide in the centrally located sections of the topmost layer amounts to 66 per cent

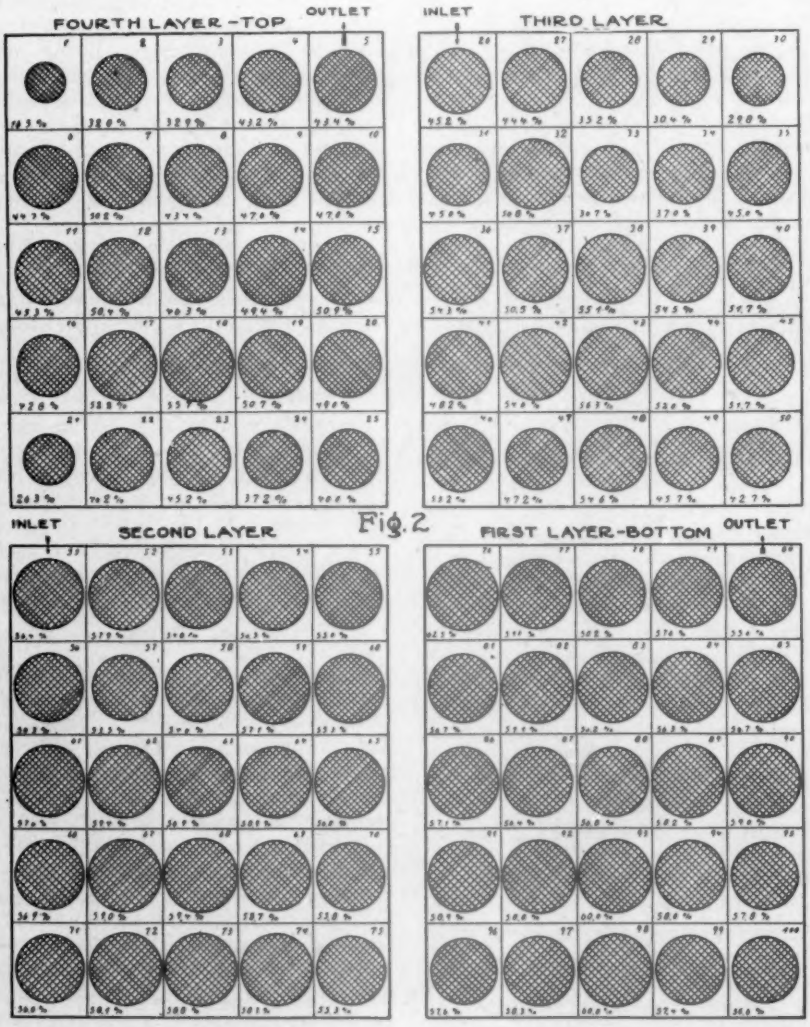


Fig. 2

on the average, it is only 19.4 per cent in the third layer and not more than 11.5 per cent in the second layer.

It is a very striking fact that the situation is exactly the opposite in the case of the first or lowermost layer of oxide. There the sections at the sides of the box contain oxide with approximately 16 per cent less moisture on the average than the oxide in the centrally-located sections. The explanation lies in the way in which the boxes were built. While the topmost part of the rectangular boxes is open to the air and hence is subjected to weathering all throughout the year, the lower part is located in a cellar space wherein the temperature is quite uniform. There follows therefrom that the lowest layer of oxide in the purifier boxes dries out more rapidly than the higher layers within the same period of time. On the other hand, it can also be concluded from the above that a certain magnitude of heat is carried into the oxide in the lower part of the boxes. The sections, which are located at the walls of the boxes in the lower layers of oxide, attain higher temperature due to this heat. Hence the speed of reaction is increased and there is considerably better absorption of sulfuretted hydrogen by the iron oxide within a limited time period by the oxides in these side sections than in the middle of the boxes. This discussion agrees with practical experience, which has proven that the high sulfur content is always found in the lowest layer of iron oxide in purifier boxes of modern construction and operation. (See figure 2, layer 1.)

Further examination of figure 2 shows that the sections numbers 3, 8, 13 in the topmost layer of iron oxide in the box have a substantially lower content of sulfur than the oxide in the adjacent sections. This phenomenon is caused by the existence of baffles or obstructions to the flow of the gas through the box which are set up intentionally by piling the iron oxide carefully into the box to form such baffles. The gas is accordingly forced to flow towards the side opposite the point of its entry. The results of analyzing the iron oxide from different sections and layers showed that the arrangement of baffles in the purifier box cannot be recommended. It does not make possible a more regular deposition of sulfur throughout the mass of oxide. Neither is the time during which the purifier box can remain effectively in operation increased by this means. The authors' observations and their investigations have led to the contrary conclusion, namely that the iron oxide must be distributed as regularly as possible over the entire area of the box. This is a perfectly logical conclusion, when it is called to mind that every gas seeks the path of least resistance in its flow through a solid mass.

Calculating Sulphur

The quantity of sulfur which is daily deposited in the first purifier box of the series can be readily calculated as follows: If the volume of gas yield which is read off daily on the station gas meter is designated as (V_o), measured under standard conditions of pressure and temperature, if the average sulfuretted hydrogen content of the gas before dry purification is designated by (i_o), also measured under standard conditions of pressure and temperature, if the efficiency of the purifier is called (n) and the quantity of sulfur in kilograms per 24 hours is designated as (S), then the following equation may be written:

$$S = V_o . i_o . 32/(22.4 \text{ c } 100) . n \text{ kilograms of sulfur in 24 hours} \quad (1)$$

$$S = 0.0143 . V_o . i_o . n \text{ kilograms of sulfur in 24 hours.} \quad (2)$$

The determination of sulfuretted hydrogen is conveniently and rapidly carried out with the aid of the usual apparatus. The results are calculated to standard conditions of temperature and pressure.

In order to present a complete discussion of this matter, omission should not be made of the fact that the iron oxide mass in the second and third layers contains a lower percentage of oil than the other layers. This phenomenon may be explained by the fact that small quantities of wash oil mist are carried along by the gas and are absorbed by the iron oxide in the middle layers, which act as filters. The results of

(Continued on page 26)

Notes on High Pressure Gas Distribution

A Discussion of the Procedure to be Followed in Taking Measurements, and Problems Encountered in Selecting a Location for the Main

By **DISTRIBUTION ENGINEER**

ON sub-transmission mains the distance to be measured was given as between property lines of intersecting streets. This policy is changed on distribution mains since on high pressure frequent tie-ins to provide loops are unnecessary, and it is often impossible in the field to select the most desirable direction of feed. The distances should be measured from the intersecting street property line to the nearest side of the first building, thence to the farthest side of the last building and the next intersecting street property line. The width of streets should not be assumed as a certain distance unless it is definitely established that all streets are uniform. It sometimes occurs that between the first and last buildings some change takes place affecting design, in which case the distance to that point should be added to the other details.

Where intersections require particular lay-outs such as off-sets to avoid concrete flares or any other difficulty, the intersection should be detailed to indicate the location of changes in the line of the main.

All distances, even those taken when detailing particular conditions, should be given to the nearest foot. It is impossible to measure sub-surface conditions within any greater accuracy than a foot when such measurements are made on the surface.

The perpendicular distance from a property line of a street to the proposed main location should be given at least twice on each street between intersecting streets. It is not always possible to locate the property line, so it is then necessary to substitute such objects as fences, hedges, line of trees or poles, etc. It should not be assumed that such objects indicate the property line, as such a policy has led to costly relocation of mains. When giving distances from such objects, it should be clearly stated whether the distance is from the center or face. Preferable base lines are the face of curbing or the edge of concrete roadways, which are usually nearer to the proposed main location than property lines.

It is preferable to use photographs marked with the proposed location of the main on streets lacking in easily distinguishable base lines.

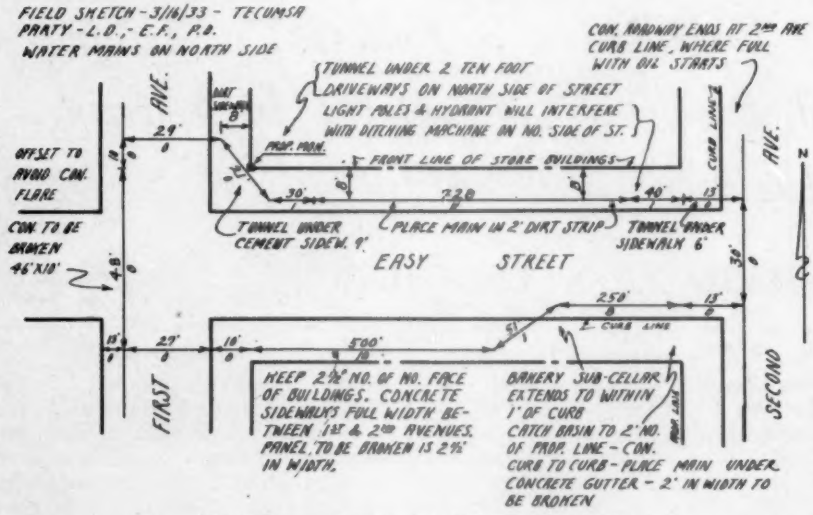
View indicating reason for Increased Costs where Mains are run in Grass Plot

Where frequent changes in the course of the main occur a picture is particularly valuable to the construction foreman, as he is apt to guess at or pace off print distances, whereas from a photograph he may select surrounding objects and easily locate the intended point of change. The photographs also save the field crew time by avoiding the necessity for considerable detailing and measuring. Such information is not of value for designing, whereas it is of primary importance to the construction crews and, therefore, such photographs should be taken and marked with the idea of facilitating construction.

It is not usual to locate and place in detail on sketches all sub-surface structures whose existence is evident from surface markings, but it is important to determine with as much accuracy as possible the maximum area occupied by such structures and select the main location to avoid them. Again the intention is facilitating construction work, by determining the extent of such sub-surface structures even at the expense of considerable field crew work which may save the time of large construction crews later, eliminate retrenching and allow trenching machines to proceed without damaging other property.

The nature of the sub-surface structure is sometimes shown by symbol or note on the sketch furnished to the construction department. The dimensions of culverts, catch basins and surface drains are the most difficult to determine even though viewing the interiors through

manholes, as often the visible portion is divided from the remaining section by a wall extending beneath the water level. Public records of such sub-surface structures should be consulted to avoid unnecessary breaking of concrete and to furnish the construction crews with definite information, eliminating their prospecting for a way past the difficulty.


FIELD SKETCH - 3/16/33 - TECUMSA
PARTY - L.D., - E.F., P.D.
WATER MAINS ON NORTH SIDE
CON. ROADWAY ENDS AT 2ND AVE CURB LINE, WHERE FULL WITH OIL STRATS
TUNNEL UNDER 2 TEN FOOT DRIVEWAYS ON NORTH SIDE OF STREET
LIGHT POLES & HYDRANT WILL INTERFERE WITH DITCHING MACHINE ON NO. SIDE OF ST.
FRONT LINE OF STORE BUILDINGS
PROP. MAIN
OFFSET TO AVOID CON. FLARE
CON. TO BE BROKEN 46'X10'
TUNNEL UNDER CEMENT SIDEW. 9'
PLACE MAIN IN 2' DIRT STRIP
TUNNEL UNDER SIDEWALK 6'
EASY STREET
FIRST AVE.
SECOND AVE.
CURB LINE
KEEP 2½' NO. OF NO. FACE OF BUILDINGS. CONCRETE SIDEWALKS FULL WIDTH BETWEEN 1ST & 2ND AVENUES. PANEL TO BE BROKEN IS 2½' IN WIDTH.
BAKERY SUB-CELLAR EXTENDS TO WITHIN 1' OF CURB
CATCH BASIN TO 2' NO. OF PROP. LINE - CON. CURB TO CURB - PLACE MAIN UNDER CONCRETE GUTTER - 2' IN WIDTH TO BE BROKEN

Field Survey of a Section to be Double Mained

Dimensions of improved roadway or sidewalk surface to be removed and replaced should be given by length and width. When the surface to be broken is continuous along a street, distances are detailed between intersecting streets to correspond with main distances so that the design engineer can provide exact dimensions to estimators without assuming distances, should the main be eliminated from parts of the street. The most common practice on state highways is to require replacement of the full width of each panel, while on town and village roadways it will often be possible to secure permission to replace a section slightly wider than the trench.

The construction crews will often be able to tunnel, drive, blow or push a main under sections of continuous improved roadways or sidewalks, materially reducing the cost under that of breaking concrete, but for estimating purposes it should be assumed that all such concrete along the line of the main will be broken, as the possibility of eliminating concrete breaking can only be determined after a section of the trench has been opened.

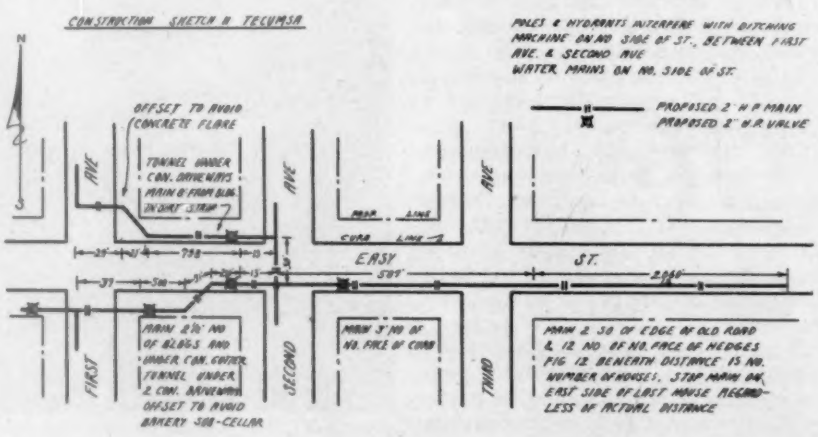
At locations such as driveways tunnelling should be standard practice to avoid interfering with the free access to residences, fire houses, hospitals, police stations, garages, etc. It is unnecessary to give specific instructions to construction crews for each location but the estimator would require the amount of tunnelling necessary as it is usually more expensive than excavation of unimproved surface trenches. It is usually sufficient to give the total length of tunnelling on a given street and between intersecting streets. On particularly wide driveway entrances such as occur in front of firehouses, it may be necessary to break up part of the driveway and tunnel the remainder, in which case the practice of assuming all the concrete is to be broken should be followed.

Some towns will allow the replacement of cobble, wood block, brick and other similar surface material with concrete, which should be clearly indicated both for the estimator and construction crew. For surface replacement on oiled roads it is often advantageous to use some type of cold patching material consisting of a mixture of gravel or broken stone and an asphalt binder along part if not all of the trenching, and particularly on steep hills. This is mentioned as part of the field survey work as such information must be furnished to the estimators.

Some localities permit tunnelling under concrete, with the provision that the backfill be concrete except for a soil cushion above the main and under the existing concrete. This practice is not recommended for new work, although it may be an economy when repairing existing mains. For estimating cost it is satisfactory to provide dimensions of the amount of surface concrete which would be replaced following usual practice and then, if construction conditions demand or warrant a concrete backfill, estimates will not be exceeded.

To secure a permit from railroads to cross under their right-of-way, it will be necessary to furnish a detailed survey in both plan and elevation showing all property lines together with rail and main locations. Practically every railroad will require that the main conveying gas be in a conduit, usually a larger diameter pipe, which in turn is encased in concrete.

Bridges require more detailed information than any other difficulty encountered. Supports, usually placed on each panel of the bridge, require minute details. Abutments offer particular difficulties, as the main usually changes direction at that point and it is also the location of special supports and expansion joints when used. While the supports at each panel point allow the main free movement, at least in a longitudinal direction, the end supports are often rigid. On bridges not over 200 feet in length and with


CONSTRUCTION SKETCH II TECUMSA
POLES & HYDRANTS INTERFERE WITH DITCHING MACHINE ON NO SIDE OF ST., BETWEEN FIRST AVE. & SECOND AVE
WATER MAINS ON NO. SIDE OF ST.
PROPOSED 2" W.P. MAIN
PROPOSED 2" W.R. VALVE
OFFSET TO AVOID CONCRETE FLARE
TUNNEL UNDER CON. DRIVEWAYS MAIN & FARM BLDG. IN DIRT STRIP
MAIN LINE
CURB LINE
EASY ST.
MAIN 2½" NO OF BLDGS AND UNDER CON. GUTTER
TUNNEL UNDER 2 CON. DRIVEWAYS OFFSET TO AVOID BAKERY SUB-CELLAR
MAIN 3' NO OF NO. FACE OF CURB
MAIN 2.50 OF EDGE OF OLD ROAD & 12 NO OF NO. FACE OF HEDGES FIG 12 BENEATH DISTANCE IS NO. NUMBER OF HOUSES, STOP MAIN ON EAST SIDE OF LAST HOUSE REGARDLESS OF ACTUAL DISTANCE
FIRST AVE.
SECOND AVE.
THIRD AVE.

Final Design of System from Field Notes shown in Illustrations on page 19 November issue, and Illustration shown above

mains not over six-inches in diameter, installations have been made and operated with no difficulty without expansion joints by eliminating all rigid supports. Climatic conditions will largely control the method selected.

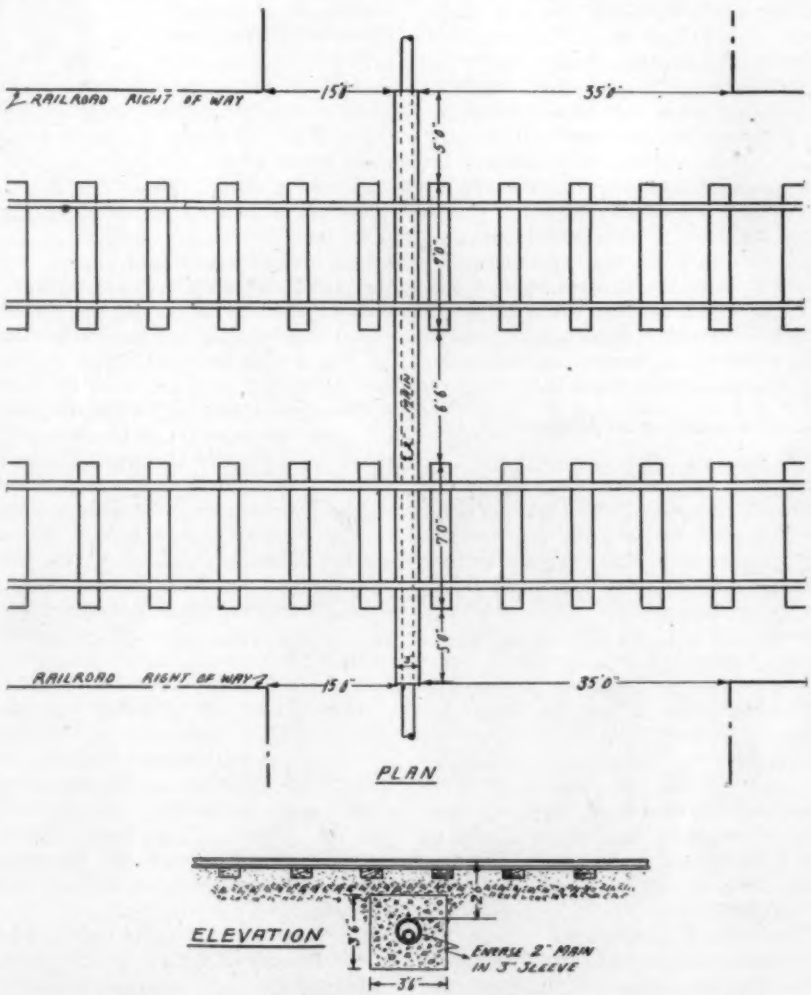
The main location selected will often require trenching where grass has been maintained in the same manner as a lawn. The removal and replacement of the sod and the extra care required to properly place the excavated material increases cost, which requires separate dimensions and notes for properly advising the estimator.

Length of Service

While it is unusual to measure up every service for design purposes or estimates, it will be necessary to approximate the average length. The service length on the highway may be accurately determined. In a city with adjacent buildings where the front of the structure is on the property line, there is no difficulty in approximating the average which will be two or three feet on private property. In suburban districts a survey of a number of properties has indicated that the average length of service on private property is between 45 and 55 feet, while in rural districts it increases to between 75 and 95 feet. The reason for these high average distances is that it is seldom possible to select a suitable governor and meter location in the front of a building. The method of securing the average length of service on private property is to select buildings at random on various streets and measure the distance from the property line to the face of the building, to which an experience dimension may be added. Valve locations are not usually selected by the field crew.

Main Location—The location of the main on the highway is designated by three different methods: by local ordinances, cooperative agreement with other utilities or choice by priority of installation. Local ordinances seldom designate the exact location but place the responsibility of selecting locations for each type of utility on one of its department heads. This method allows a desirable flexibility, as the use of both surface and sub-surface sections of highways alters materially in the course of time. In new streets there is little interference from other utilities but in old highways, especially in downtown sections of cities, there is confusion due to the variety of uses and often a single utility may have several structures. The disadvantages with the local ordinance method of designation is that locations are usually selected by those affiliated or directly interested in the maintenance and construction of the highway surfaces whose views are influenced by their own problems and not by the sum total of highway uses both above, on and under the surface.

Local ordinances have preference over all other highway permits required, but regulations imposed by state highway departments are usually more stringent than local requirements. Practically every state requires that all sub-surface structures be re-constructed or re-located in advance of surface improvements, as no trenching will be allowed for a period of years after completion of the improvement. The reaction to this policy by utilities making frequent connections to a sub-surface structure for the establishment of service to consumers has been the moving of their structures to avoid the state highway improvement; this is resulting in excessive crowding of the small remaining space. Highways must be used for sub-surface structures and so providing for such uses at a minimum cost to utilities, will be reflected in lower rates.



Details for securing Permit, and Construction at a Railroad Crossing

Ordinances Need Watching

Political units of all sizes are legislating regulations covering not only the designation of certain locations for particular uses in highways but also the methods to be used during construction and operation. Most of such ordinances are copied from established ordinances drawn up under conditions no longer existing and are a handicap to anyone who must use highways and in many particulars impossible to follow. Utilities should closely follow any attempt to establish such ordinances and attempt to have clauses which will be fair and reasonable written into them. The attitude that such an attempt may be construed as in-

fluencing legislation should not deter every effort being made to secure fair and reasonable clauses, as a utility is one of the largest local taxpayers and, therefore, has very definite rights and should protect its consumers against unnecessary expenditures. The fact that anything increasing costs to a utility has a direct reflection in practically every building in a community should be emphatically stated. In this as in many other matters a utility must keep in mind ever increasing competition and should eliminate all possible non-revenue producing capital expenditures, for, while earnings are allowed, such earnings may raise the rate of a commodity so as to encourage competition.

Cooperation Difficult

A practical plan for complete cooperative selection of locations is difficult to secure, although it is often possible to have the major utilities agree on a plan. The privately owned utilities are more susceptible to cooperation than those publicly owned, as anyone directly or indirectly connected with politically controlled bureaus assumes priority in all cases and will not be bound by any agreements. A plan which experience has demonstrated to be feasible is the establishment of a clearing house for all types of mutually valuable information and to investigate and solve such common problems as location of highway structures.

The third method of choice by priority requires the decision being made in the field. If the engineer has not already made a selection, it

Photograph by Field Survey Crew indicating Proposed Location of Main in Grass Plot

is the duty of the survey foreman to decide on the main location before measurements are made.

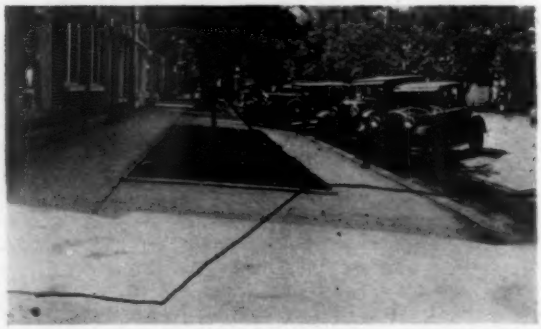
In many of the more recently planned towns and cities it is possible to have the distance from the property line to the main standardized, especially on all streets of the same width. This plan materially facilitates the locating of a main by repair or service crews and also allows a construction foreman to spend more time on other matters. However, too much emphasis should not be placed on a standard distance from property line to main, as it is seldom found possible in actual practice. The construction foreman should understand that the distances shown on a print are to be followed when possible, but particular emphasis should be placed upon the necessity of securing exact measurements of the actual location after installation.

On unimproved highways the lowest part of a gutter, embankments, roots, oiled or clay and gravel topped sections should be avoided. This will require varying the distance between property line and main at numerous locations but has the advantages of lowering initial investment, decreasing maintenance costs, and lengthening the life of steel main.

The type of improved pavement is a prime factor in selecting location. The width of improved sections to be removed and replaced often determines a location, as for example, where concrete exists from property line to property line the concrete gutters will often be found the most economical section in which to lay a main.

Portions of sidewalks, parkways, or the centers of highways are sometimes purposely free of improvements to facilitate constructing and maintaining utility subsurface structures. Where unpaved sections are left in the center of highways, low main costs result, but the increased cost of installing services under the improved sections and longer service lengths often counteract the saving on the main and real economy is secured by double maining in the sidewalk areas.

Whenever a sidewalk or parkway area adjacent to the sidewalk is considered for the main location, double maining is not always necessary, as on sparsely settled streets a main will often be initially installed on only one side and the few services carried underneath the improved section of the highway with provisions for double maining in the future as the number of buildings increases to a justifying extent. The advantages of double maining are: eliminating the most costly sections of services; removing and replacing the improved section not only during the original construction but on service connection or maintenance work; economy of initial main installation; facilitating repair and leak detection; placing investment in mains where carrying capacity has more potential value than in services.



Photograph of a complicated Section by a Field Survey Crew

Consideration of Sidewalk Location

There are disadvantages to sidewalk location, as it is sometimes necessary to trench deeper than in the roadways to avoid the following obstacles: drips at street intersections; obstructions such as poles, electric, water and telephone services; sewer connections; extended basements; roots; terraces; shrubs; coal chutes; catch basins; surface drains; tanks for such purposes as gasoline; cost of removing and replacing sod; consumer objections, which are less in highways than on sidewalks; special permission which some states require from each adjoining property owner, as civic control is only in the traveled highway; likelihood of the legal status of a sidewalk for highway purposes not being clear; legislation or local ordinance against such use of sidewalks; less distance for leakage to escape into the atmosphere before entering buildings and the objection particularly in business districts to having sidewalks opened up in a manner to even temporarily restrict trade.

The improved section of a sidewalk should be avoided if possible, even though it requires tunnelling under tree roots or bending around poles, as it is impossible to absolutely match the coloring of a concrete sidewalk with sections not removed. The practice of breaking out a full square of the concrete sidewalk has been mentioned. The advantages are that a slight difference of color between the remaining original and

(Continued on page 30)

ELEMENTS OF GAS TECHNOLOGY

Operating the Gas Producer

INASMUCH as producers may be used for various purposes, such as the production of a power gas for use in blowing engines as in the steel works, or for supplying heat to a bench of retorts or chambers in the manufacture of coal gas or coke oven gas, the operation of the apparatus varies. As far as its use and operation in connection with the manufacture of gas is concerned, we will leave the discussion until the subjects of coal gas and coke oven gas are reached. In general there are six main points that must be borne in mind in operating the producer so as to obtain maximum heat economy and gas production of highest quality and uniformity.

In the first place, the coal should be fed to the producer in a continuous and uniform stream over the fire bed. In the second place, any channels that are formed in the bed of coal in the producer should be kept closed by mechanical means. Thirdly, when the bed is poked for the purpose of closing up blowholes or channels in the mass of coal, care must be taken to see that the ash is not mixed with the coal. Fourthly, the ash should be removed uniformly and by mechanical automatic means. Fifthly, the mixture of air and steam should be distributed evenly over the bottom of the fuel bed, and lastly, the amount of steam that is used in the producer should be under independent control in order to permit the maintenance of a constant air-steam ratio with varying load.

Correct operation of the producer, which is obtained by careful attention to the above details, is moreover based on the formation of gas containing as high a percentage of carbon monoxide as is practical, and furthermore, on the use of sufficient steam to allow the desirable reactions to take place, as well as to protect the grates from being overheated and to gain other advantages which have been discussed in previous pages. Carbon monoxide is formed from carbon dioxide and oxygen by a simple incomplete combustion reaction. It is almost impossible for this reaction to take place effectively in the producer without increasing the temperature very considerably. It has been estimated that the time of contact between the carbon dioxide formed from the coal of the fuel bed in the producer and the oxygen of the air blown into it is only one-half to three seconds, which is much too short a period of time to allow the carbon monoxide reaction to take place with large production of the gas unless the temperature within the coal bed is very high. Experiments have proven that the temperature is, moreover, a more important condition in the formation of carbon monoxide than the time of contact, from the standpoint that a greater increase of carbon monoxide in the producer gas is obtained when the temperature is increased than when a corresponding increase is made in the time of contact. Thus, when the temperature within the fuel bed of the producer is 2300 degrees F., the percentage of carbon monoxide in the gas is 16 per cent with one second time of contact and 23 per cent with two seconds time of contact, while at a temperature of 2450 degrees F. the percentage of carbon monoxide in the producer gas is 28 per cent with only one second time of contact. Figure 6 shows the important relations between temperature, time of contact and percentage of carbon monoxide in the producer gas for the reaction between coke and a mixture of 21 per cent carbon dioxide and 79 per cent nitrogen.

In order to obtain a producer gas with a high content of carbon monoxide, it is first necessary that the surface of the fuel exposed to contact with the gases should be as large as possible. This depends upon two factors, namely, the nature of the fuel and the size of its particles. Thus, for example, coke, which is a highly porous substance, gives a larger surface than bituminous coal. Of course a very finely pulverized fuel might be used with the idea of obtaining maximum contact surface, but it is important to remember that the effectiveness of the small size of the particles in this particular case is negated to a certain extent by the greater difficulty of the passage of gas through the fine material. Hence, there is a practical limit to the fineness of the fuel beyond which it is unwise to go and beyond which there is no further gain.

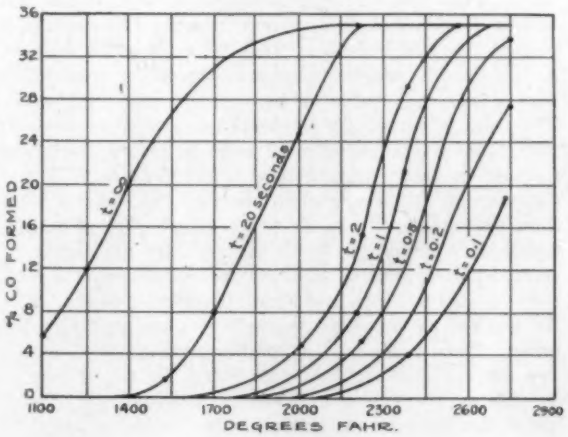


Figure 6.

The time of contact, as mentioned above, should be as long as possible. This is generally secured in an economical manner by increasing the depth of the fuel bed, but here again there is a practical limit which must not be overstepped. The third factor is the temperature, which should be as high as possible. A practical limit is also set beyond which the temperature must not be increased and this is generally the extent of formation of clinker which is, of course, the greater the higher the temperature. There is, moreover, another limiting consideration, and that is, that, inasmuch as increase of temperature is accomplished by a higher rate of gasification, such higher rate naturally connotes decreased time of contact. A happy medium must be reached and advantage must be taken of the greater effect of temperature increase than of time of contact increase and conditions must be chosen to give the best results with the greatest economy.

The second factor influencing the percentage of carbon monoxide in the producer gas is the addition of steam. While the theoretical aspect of the addition of steam has been discussed in earlier pages, the quantity of steam used and its control are practical features of the operation of the producer. One point is essential, namely, that all the steam added should be decomposed as completely as possible; otherwise, additional heat losses are incurred in the waste gases. The effect of steam in lowering the temperature of the fuel, while at the same time increasing the

formation of carbon monoxide, means that the quantity of steam used must be adjusted against the other conditions controlling the operation of the producer. The best advice is that the quantities of steam and air should be regulated in such fashion that the temperature of the fuel bed is the maximum possible without resulting in excessive formation of clinker. Practical conditions surrounding the operation of the producer control the quantity of steam added. About one-third of a pound of steam per pound of carbon is a figure sometimes used, or two-sevenths of a pound of steam per pound of coke.

When the producer is used for the purpose of furnishing a fuel gas to retorts or chambers making city gas, it is sometimes found advantageous to avoid using steam and to introduce carbon dioxide into the producer to prevent the formation of clinker. A large and convenient source of carbon dioxide is, of course, the waste gases from the coal or coke oven gas plant, which are withdrawn from the waste gas flue and introduced along with the air under the grate of the producer by means of a steam injector. These waste gases consist of approximately 20 per cent carbon dioxide and 80 per cent nitrogen. Absorption of heat in the fuel bed takes place by the reaction between carbon dioxide and the incandescent carbon, resulting in cooling the fuel bed and preventing clinker formation. The composition of the producer gas, which is made in this manner, is identically the same as that made by the reaction between air and coke. The difference is that the reaction between carbon dioxide and coke absorbs heat, while that between air and coke generates heat. Of course the thermal power of the producer gas is not increased by this practice as in the case where steam is used.

From what has been said above, it follows that the hotter the fire bed in the producer, the better the quality of the producer gas, provided that all the other controlling factors are also kept at their best levels but subordinate to the fire bed temperature. However, it should not be supposed that the temperature of the gas made or the temperature at the top of the fire bed is an accurate indication of the temperature within the fire bed itself. It is claimed on the contrary that the best gas and the most efficient gasification are obtained when the depth of the fire bed is so great that the top of the bed is comparatively cool, while the bottom is extremely hot. Thus the gas is cooled before it leaves the producer. The result is that the heat in the gas is given up to the incoming coal instead of being lost by radiation in the flues. Hence, it is concluded that the temperature of the bottom layer of the fuel bed should be maintained close to the fusion point of the ash, and the temperature of the outflowing gas should be usually about 1200 degrees F.

Sometimes serious trouble is encountered with the formation of clinker in the coal bed. To overcome this, it is suggested that the air damper should be closed somewhat and the quantity of steam blown in should be slightly increased. As said before, the use of the exact quantity of steam is very important as far as the efficiency of the producer is concerned, and while steam is effective in preventing the formation of clinker, the danger of using too much steam is always present. Hence, it has been proposed to prevent the formation of clinker by making the fuel bed thick. It is claimed that this is the better plan in the long run.

Furthermore, the deeper the fuel bed, the better the quality of the gas produced, provided the temperature at the bottom of the fuel bed is high enough. When the fuel bed is too thin, a poor gas is obtained, that is, one which contains a high percentage of carbon dioxide and a low percentage of carbon monoxide. Enough air should always be used in the blast so that the fire bed can be kept deep. It is also well to keep the fuel bed fairly compact. Too loose a fuel bed with small or large blow holes makes a gas which is likewise low in carbon monoxide content and high in carbon dioxide content. This is particularly true when the fire bed is too thin.

Use of Oxygen in Making Producer Gas.—Due to the nitrogen present in air the producer gas, which is made therewith, is always diluted and usually contains slightly in excess of fifty per cent of nitrogen. This decreases the heat value of the producer gas and also the flame temperature which is possible with the gas. The use of oxygen for enriching the air blast greatly improves the quality of the producer gas. As cheap sources of oxygen gas become available, the process will assume greater importance. It is interesting to note the type of gas that can be made with the aid of oxygen from a gas coal of the following analysis:

Constituent	Per cent
Fixed carbon	60.0
Volatile matter	34.0
Ash	6.0
Total carbon	80.0
Heating value	14,240 B.t.u. per pound

The composition of the gas as compared with ordinary producer gas is shown in the following tabulation. The figures are obtained by calculation.

Constituent	Using air per cent	Using Oxygen per cent
Carbon dioxide	3.5	3.0
Ethylene	0.8	1.4
Methane	2.7	7.6
Hydrogen	12.0	28.0
Carbon monoxide	29.1	58.0
Nitrogen	51.9	2.0
	100.0	100.0
Heating value (B.t.u. per cubic foot at 60 degrees C., 30 inches Hg, and saturated with water)	176 B.t.u.	383 B.t.u.

The first characteristic of the oxygen-made producer gas is the considerably greater thermal value. The high carbon monoxide content is also a feature. Under these conditions the producer may be operated as a slagging-ash producer, or sufficient steam may be introduced into the fuel bed to keep the ash from clinkering. The operation of the producer is really such under these circumstances that it becomes in effect a continuous water gas generator.

Heat Losses in the Producer.—Inasmuch as the producer is an energy machine, that is, an apparatus for converting one form of heat energy, represented by coal or coke, into another form of energy, namely producer gas, the efficiency of the operation will depend on how well heat losses are controlled. A definite temperature must be maintained in the fire bed for the production of gas under the best conditions, and this means that a certain quantity of the fuel must be burnt entirely for this purpose. The greater the heat losses, the more such fuel must be consumed.

(Continued in January issue)

Gas Fired Immersion Burners in The Brewery

Industrial Gas Engineers and Brewery Technologists Develop New Method for Heating Brew Kettles, Thereby Saving Expense of an Additional Boiler and Attendant, Providing Cleanliness and Ease of Control, and Producing a High Quality of Brew

By
THEODORE REICHHART
Theodore Reichhart, Inc., Brewers
LAWRENCE E. BIEMILLER and RAYMOND TIMANUS
Industrial Fuel Dept., Consolidated Gas Electric Light and Power Co. of Baltimore

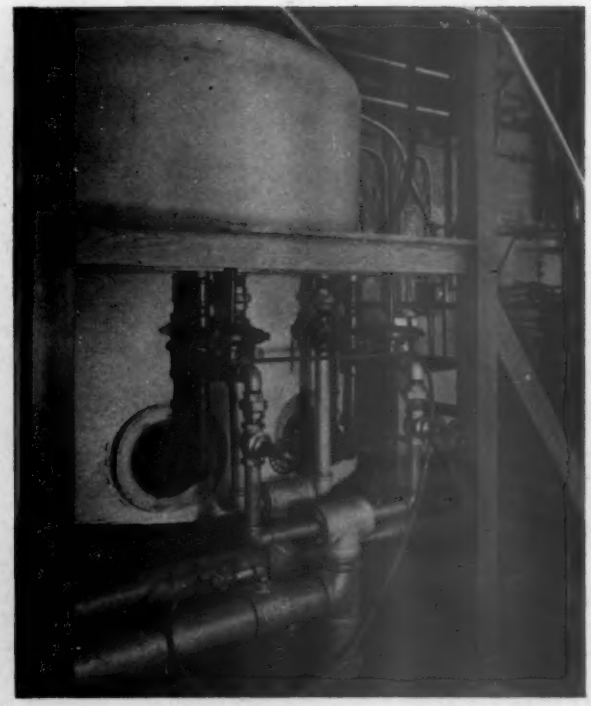
A NEW moderate size brewery, Theodore Reichhart, Inc., has recently begun operations in Baltimore. It uses malt extract, thus eliminating the necessity of a mash kettle. This extract, hops and the requisite amount of water are cooked in a direct fired brew kettle, and the result is unfermented beer. This unfermented beer when fermented with yeast for the proper length of time at a specific temperature, and then aged for a definite time at a predetermined temperature, is finished beer ready for racking or bottling, and distribution.

When this desire for direct firing of the brew kettle was discussed with engineers of the Consolidated Gas Electric Light and Power Company, they suggested the use of gas fired immersion burners. To be absolutely sure that this method of heating would give the desired quality of beer, a small experimental immersion kettle about 30 by 20 by 12 inches was built and a test batch of beer successfully brewed therein. Then it was decided that the proposed brew kettle should meet the following specifications:

1. Heat 20 barrels (beer kegs) or 640 gal. of water from 50° to 120° F in 25 minutes.
2. After addition of malt extract heat resulting 6040 pounds of solution from 120° to 210° in 45 minutes.
3. Kettle capacity well in excess of above load to allow for bigger batches, and vigorous boiling without overflow.
4. Ability to cook extract mixture and evaporate at least 8% of full kettle capacity in one hour.
5. Kettle to be insulated and hooded.
6. Heat input shall be readily controllable.

Gas Immersion Burner Coils in Interior of Reichart Brew Kettle

To give the desired kettle volume it was decided to make it 7 feet in diameter and 6 feet tall. Since the initial heating may be of only 640 gallons water it was necessary that the immersion coil be kept within a height of approximately 30 inches from the bottom of the tank. To heat at the rate desired it was found necessary for heat to be put into the solution at the rate of approximately 900,000 B.t.u. per hour. From previous experiences it was decided that it would not be practicable to put into the tank sufficient area of immersion coil if atmospheric burners were used. Therefore it was decided to use



Proportional Mixers and Control Valves on Immersion Heated Brew Kettle

two of the No. 4 Gas Fired Immersion Heaters made by the Steam and Combustion Company of Chicago. By the use of 20 ounce air it would be possible to burn in these two units at least 1,100,000 B.t.u. per hour which will result in the desired input to the solution.

These immersion heaters consist of a gas burner firing into a submerged refractory lined combustion chamber which extends into a submerged pipe coil. In this case the combustion chambers lie horizontal; from them extend four inch coils, each 30 feet long (exclusive of part serving to conduct gases to the flue), and having nine elbows. Due to having blast burners, there is no objection to any reasonable number of bends, and to a relatively small pipe diameter. From extensive experience of the burner manufacturers, no hesitancy was felt in designing the coil for a heat transfer of at least 20,000 B.t.u. per hour per sq. ft. of coil area.

To obtain maximum combustion efficiency, and ease of control, it was decided to install the proportional mixer type of immersion burner. In this type gas is supplied through a governor reducing its pressure to atmospheric pressure regardless of the rate of gas flow. Primary air flows from a nozzle located at the outlet of this governor, and it inspirates gas in quantities proportional to its rate of flow. Secondary air proportional to the flow of primary air, is added in such a manner as to surround the rich primary mixture as it flows into the refractory lined combustion chamber. This results in keeping the burner cooler and in a reduction in combustion noises. With the proportional mixer type burner it is possible to set the air-gas ratio so as to obtain the desired flue analysis and to know that this same efficient combustion will be obtained each time the equipment is operated.

Immediately on the completion of the installation of this brew kettle the burner was adjusted to give 2% oxygen with no carbon monoxide; meanwhile, a test was run heating water, with results as follows:

Amount water—37¾ barrels or 10,200 pounds, water evaporated 3/32 in. or 18 pds.
Water heated from 154° to 204°, temperature rise 50°.
Time required—40 min.
Gas used—643 M B.t.u.
Flue gas—temperature 410°F.
—analysis 13.4% CO_2, .7% O_2, .2% CO.

Heat Balance	"M" B.t.u	%
Sensible heat of water..	502	78
Water evaporated	18	3
Lost in flue gases.....	109	17
Radiation—by difference	14	2
Total	643	100

"M" B.t.u. transferred per sq. ft. internal coil surface—16.8. (Full gas capacity not turned on at this time. Later the gas was increased 35% with an increase in flue temperatures of less than 20°.)

A little later the first brew was run on this kettle and it was very successful. The operating schedule was changed somewhat from that considered in preparing specifications for the kettle, as is shown in the next column.

By the use of a gas fired immersion heated brew kettle, Reichhart Company secured maximum fuel economy as is shown by the foregoing heat balance. They saved the expense of a boiler which would have been about 50 horsepower. They saved the expense of an engineer for the boiler. In addition, they have the cleanliness and ease of control always resulting from the use of gas. These are all in addition to the quality of brew previously discussed.

Time	Temperature of Batch	Gas Meter* Reading—Cu. Ft.	Remarks
7:45	70	42,200	Gas on—Started with 35 barrels (9370 lbs.) water and 1300 lbs. extract and hops.
9:15	212	45,700	Burner throttled.
11:15	212	48,500	Gas off — Batch allowed to settle and pumped to cooler.

* Gas has 500 B.t.u.

Total gas used—6300 cu. ft. or 3160 M B.t.u.

Batch evaporated from 37½ bbls. to approximately 34 bbls.

M B.t.u. per bbl. of unfermented beer—93.

Estimated gas per bbl. of finished 3.2% beer—90 M B.t.u.

Besides this brew kettle, the Reichhart Company uses gas for all their other heating operations. Water is heated by an instantaneous heater. There is an 8 hp. high pressure gas boiler used for steaming of barrels or for any small steam requirements, such as cleaning of pipe lines, kettle, tanks, etc. Their fermentation and storage tanks are coated with mammut imported from Germany. It is obtained in a large solid piece which is broken with a chisel or pick. Small pieces are heated in a gas fired kettle until melted. Meanwhile, the interior walls of the tanks are heated with a gas torch, after which the molten material is brushed on and the walls again heated with the gas torch. When it cools, it sticks very tight and at the same time is somewhat elastic. Kegs are given a coating of pitch on their inside surface by holding them over a gas heated pitch pot and spraying hot pitch into them. When desired, the pitch is removed from old kegs by heating them over the pitch burner shown in the accompanying picture. Kegs are branded on each end with copper brands heated by gas.

The Reichhart Brewery is a typical example of the very modern, moderate size brewery. By the use of gas heat for all his heating opera-

tions, Mr. Reichhart finds it possible to devote all of his time to the actual making of the beer. With gas applied in the manner here discussed he is assured of the maximum quality of beer. His motto is "Quality Beer" and he is prepared to supply it to the most discriminating and appreciative beer drinker.

Technical Literature Shows Advantage of Direct Heat on a Brew Kettle

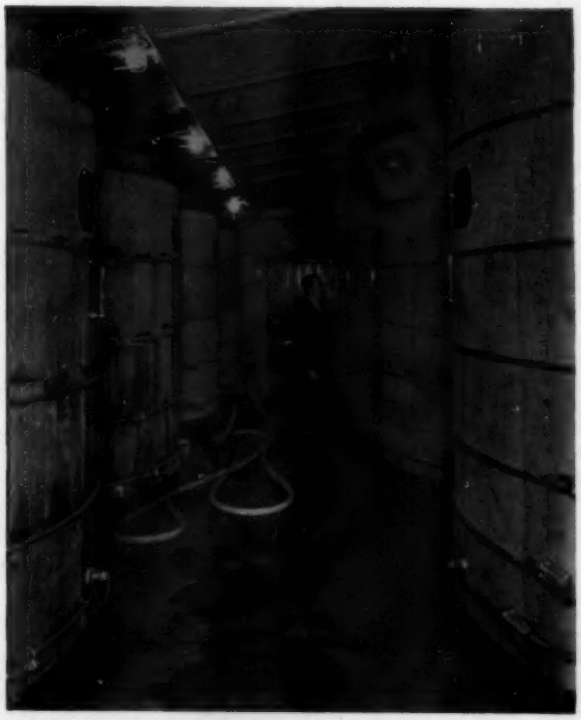
A RECENT investigation of technical literature pertaining to beermaking disclosed details which will probably be of interest to Industrial Gas engineers. The first thing they will be interested in is the outline of the process, whether using unsprouted grain, sprouted or malted grain, or malt extract.

A brewery may begin its manufacture of beer with unsprouted grain, or with sprouted grain, making its malt; or it may purchase malt extract. The grain used is chiefly barley, though in America corn and rice are used in small percentages. If starting with unsprouted barley, the barley is soaked in water to soften, the water run off and the barley allowed to sprout for about six days, and then dried. This grain, or grain bought already sprouted, is mixed with water and cooked in mash tubs. This cooking extracts the soluble matter and converts the insoluble starch and a great part of the insoluble nitrogenous compounds into soluble and fermentable products. After pumping the solution or wort from the spent grain it is ready for the brew kettle.

The Brewing Process

If malt extract is used instead of grain the process begins in the brew kettle. Sometimes the malt extract is added to cold water in the kettle, and sometimes the water is heated to about 150° before the extract is added. Some hops are added before the water is heated much, and some more hops added after holding at cooking temperature awhile. About 1½ to 2½ hours is a good time for bringing the batch up to the boiling temperature, and then it is cooked for about 1 or 2 hours. If beginning with grain as described in the preceding paragraph, the cooking in brew kettle is about the same except that of course one starts with wort from the mash tub and only hops are added.

From this point the process is exactly the same. The hops and other solid matter are drained out from the unfermented beer and the latter is pumped to a cooler and thence to large fermenting vats where yeast is added. The fermentation is allowed to continue usually for from 4 to 7 days when the resulting beer is pumped to storage tanks where it is allowed to age. It is important that the beer be held for definite time periods and at definite temperatures when in the processes of cooling, fermenting and aging. From aging tanks the beer is run to a tank where it is measured under government supervision for taxation. Then it is ready for carborization, the addition of carbon dioxide under pressure, and bottling, or racking into kegs.



Fermentation and Aging Tanks in the Brewery of Theodore Reichhart, Inc.

In a typical beer making process one starts with about 135 parts of water to produce 100 parts of beer. Twenty parts are left in the grain, 10 parts lost in boiling, and 5 parts evaporated in the cooler. About 100 pounds of malted grain, ½ pound of hops, and ¾ to 1½ pounds of yeast are used per barrel of beer.

The thing which will be of most interest to the Industrial Gas engineer is the possibility of heating the mash tub and the brew kettle with gas. The usual American practice is to use steam for both operations. Little information was found in the literature regarding the possibility or the practice of using direct heat on the mash tubs.

However, some very interesting information was uncovered regarding the use of direct heat on the brew kettle. Of particular interest was information in the June 15, 1933 issue of Modern Brewery. One article was composed of excerpts from an address of Dr. L. Nathan before the New York Chapter of the Master Brewer's Association. Another was entitled "A Guide to Types of Primary Brewing Equipment," by Paulsen and Herntz, Inc.

These and other sources of information point out the fact that direct heat is largely used for brew kettles in England and on the Continent of Europe. They state that the highest quality beers are brewed on direct fired kettles. It is felt that momentary contact with the higher temperatures of direct firing imparts to the beer a desirable flavor. They also state that the highest quality beers

are obtainable only from kettles capable of evaporating 7 or 8% of their contents in one hour. This rapid heating and resultant violent agitation results in a more complete elimination of the protein substances capable of coagulation so that the resultant beer has far greater brilliancy. It is admittedly difficult to secure this rapid rate of evaporation from the usual design of steam heated kettle. It can readily be obtained with direct fired kettles. It is possible to obtain it in special design of steam heated kettle.

This matter is of vital importance to the Gas Industry for it opens to them the possibility of obtaining the large brew kettle heating load. Not only quality beer, but very economical fuel application can be secured by the use of immersion burners. It is easily proven that well insulated brew kettles can be heated with immersion type blast burners with a resulting thermal efficiency in excess of 80 per cent based on the gross heating value of the gas.

Distribution of Sulphur in Purifiers

(Continued from page 16)

the aforedescribed investigations and discussions lead definitely to the conclusion that there must be considerable differences of temperature in the iron oxide mass of the various layers and within each layer in the purifier box. For the present it is not known just how great these differences are. However, it is possible to calculate approximately the total heat which is set free during a day's operation in a purifier box.

The absorption of sulfuretted hydrogen and the regeneration of the spent oxide are known to be two chemical processes which differ markedly from one another. While the first process may be considered as a pure neutralization process, the second is concerned with oxidation. The mechanism of reaction is depicted in the following equations.

1. Absorption. $3H_2S + 2\ Fe(OH)_3 = Fe_2S_3 + 6H_2O + 14.9$ kilogram-calories
2. Regeneration. (a) $Fe_2S_3 + 2H_2O + O_2 = 2Fe(OH)_2 + 3\ S$
   (b) $2Fe(OH)_2 + H_2O + 1/2\ O_2 = 2\ Fe(OH)_3$
   (a + b) $Fe_2S_3 + 3H_2O + 3/2\ O_2 = 2\ Fe(OH)_3 + 3S + 145$ kilogram-calories.

It can be concluded from the aforegoing equations that approximately 160 kilogram calories are set free during the absorption and regeneration of three molecules of sulfuretted hydrogen. Inasmuch as three molecules of sulfuretted hydrogen are equivalent to 102 grams, the heat liberated for one thousand grams of sulfuretted hydrogen is 1600 kilogram calories in round numbers. Calculated to standard conditions of temperature and pressure, one thousand grams of sulfuretted hydrogen occupy a volume of 0.658 cubic meter. If the daily gas production is V_o (calculated to standard conditions of pressure and temperature), if the average content of sulfuretted hydrogen in the gas is i_o before purification (also calculated to standard conditions of temperature and pressure) and if the average efficiency of the first purifier box is n, then the equation for the heat liberated is as follows:

$$Q = V_o . i_o . 1600/(0.658 \times 100) . n \text{ kilogram-calories per 24 hours} \quad (3)$$

or

$$Q = 24.32 . V_o . i_o . n \text{ kilogram-calories per 24 hours.} \quad (4)$$

If the quantity of heat liberated is plotted on a curve against the time of efficient operation of a purifier box, then it is found that the exothermic reaction within the iron oxide mass must constantly decrease with increase in the time of operation of the first purifier box in the series and with decreasing efficiency. The above expression naturally refers to a purifier box during the third operating period, in which the box is first in the series. If equation (4) is divided by equation (2), then the following is obtained:

$$K = \frac{24.32 . V_o . i_o . n}{0.0143 . V_o . i_o . n} = Q/S \text{ kilogram-calories per kilogram of sulfur}$$

$K = 1700$ kilogram-calories per kilogram sulfur; hence

$$Q = K . S = 1700 . S \text{ kilogram-calories per 24 hours.}$$

When the quantity of sulfur that is deposited within a 24-hour period is known, then the quantity of heat which is set free during the same can be calculated without any difficulty.

It has also been found that the drying out of the iron oxide mass during the regeneration of the spent oxide in the box takes place principally during the third operating period and must result in the formation of an extraordinarily dry and hence hard material. The quantity of heat which is liberated during this time must accordingly gradually evaporate the moisture present in the mass. If the mass is dry in the original state, then the heat liberated in comparatively large quantities must be manifested in unfavorable phenomena. The authors have not yet investigated the question of the most favorable moisture content of the mass. Nevertheless, it can be concluded that there can be no practical objection to the use of Lux mass with a water content of approximately 50 per cent.

The conclusions derived from these investigations are that the separation and deposition of sulfur in the purifier box is largely dependent on the temperature, that the round purifier box appears to be more favorable than the rectangular box and that thorough and effective insulation of all parts of the purifier boxes which are exposed in the open is indispensable.

Convection Heating by Recirculation

THE use of recirculating convection heaters is at present limited to those processes which require a temperature of not over 1200 deg. F. In general it may be said that heat transfer by radiation is more effective at higher temperature than heating by convection. There is, of course, somewhat of an overlap of the field of convection and radiation, and considerable disagreement exists as to the correct method of heating within the range of this overlap. It is well realized now, however, that most processes under 1200 deg. F. can be heated most efficiently by convection.

In convection heating air is drawn into the recirculating heater either by suction or pressure, where it comes into intimate contact with the hot combustion gases and is heated rapidly. The heated air, together with the products of combustion, then enters the oven or furnace under a slight pressure through suitably placed ductwork and quickly diffuses to all parts of the heating chamber. Having given up part of its heat, the air returns through another system of ducts to the heater, where it repeats the cycle. It is necessary to vent to the outside atmosphere only enough air and gases to insure complete baking or processing of the work; this loss being made up by fresh air drawn in either at the heater, the heater fan, or the ends of the oven or furnace itself.

If the material being heated contains any volatile solvents such as japan thinners, lacquers, and the like, these will be vaporized and will return with the other gases to the heater, where they will be incinerated by passing through the gas flame. In this way it is often possible to add a considerable amount of heat to the system by the combustion of these volatile products.

A Co-operative Plan That Bids Fair To Produce *Results*

Wherein Is Told How Home Service Work Has Taken On Greater Significance by Reason of Cooperation with Dealers and How the Gas Company Helps Out with Window Display. Plan Is Producing Increased Appliance Sales

By

WILLIAM J. CASHMAN

Trade Relations Director, Empire-New York Group, Associated Gas & Electric System

and

FRED S. HOEFER

Assistant New Business Manager, Empire-New York Group, Associated Gas & Electric System

(Continued from November issue)

THE management encourages and fosters trade associations, gas appliance merchandising leagues, and other group meetings in order to:

(a) Maintain standards and strive for merchandising ideals.
(b) Promote better fellowship and more cordial business relations.
(c) Arbitrate grievances, prevent discrimination, and eliminate unethical procedure.

With the rapid development of our appliance merchandising business in the several years prior to the inauguration of the dealer cooperative plan, we found that a corps of able women trained in the art of home making, and specializing in the use of gas appliances could be of great help to us.

This home service work was not abandoned at the time of the set-up of the dealer cooperative plan, and we feel that this work is of even greater value to us under our present system than before. Their work in the homes of our gas customers has brought us good-will and friendship. The assistance which they have been able to give housewives who have purchased appliances, either from us or from the dealer, has brought us the assurance that those appliances are being operated correctly, and are giving the gas consumer the maximum of service and satisfaction. This customer goodwill and satisfaction in the use of the appliances has resulted in a gratifying increase in the use of gas.

These home service women follow up every sale of a range, water heater, or other load-building gas appliance in the district. The purchasers of these appliances are called upon promptly after the appliance installation. The home service women make sure that the equipment is operating satisfactorily and often are obliged to teach the housewives to operate the appliances properly. In the case of a gas range, the utility's representative might assist the housewife in baking.

The value of avoiding any dissatisfaction which can result, not through any fault of the appliance, but through a lack of knowledge and understanding on the part of the customer, is worth much to us. It means that instead of a dissatisfied user we have an enthusiastic booster who brings us more sales and more use of our service.

During the past year and a half we have, through the cooperative effort of our home service women and our salesmen, worked out a plan of appliance demonstration which has brought many sales, either to the utility or the dealer. This consists of serving an attractive meal to a small group of prospects in the home of a recent happy purchaser of an appliance. This often seems to be the means of persuading a prospect to make an immediate purchase.

The home service women assist department or hardware stores in giving cooking schools and demonstrations. As many as 500 women a day attended a cooking school sponsored by an Ithaca department store for three days during March.

A home service woman from the local office of the New York State Electric & Gas Corporation demonstrated new recipes and low cost meals. Prizes were donated to the persons holding the lucky door-tickets.

Small appliances are displayed in the utility company store or sales floor, but no selling effort is placed upon them. Terms are cash for all appliances selling for less than $10. This eliminates the utility company from competition with dealers who are placing special effort on small items. There is no particular inducement for customers to purchase these items from the gas company when terms do not permit their application to the service bill.

Special efforts are conducted by the marketing group to dispose of obsolete or shopworn merchandise. These coordinated efforts, capitalizing on group action, eliminate tendencies toward price cutting, break down suspicion among retail dealers, and assist all members of the group in conforming to good trade practice. Such disposition of merchandise that cannot be sold at established prices is largely made during the valley period of the sales curve to accelerate buying at a time when such purchasing is a welcome addition to selling effort.

Utility Should Not Be Jobber

We have determined by analysis that the public utility should not act in the capacity of a jobber. Reputable jobbers throughout the state are in a position to fill dealers' orders adequately at all times. We found them well organized and equipped to perform their marketing function.

We are doing everything we can to facilitate cooperation between jobbers and local dealers, but we do not assume the jobbing function in any way unless asked to do so by the distributors.

In order to stimulate acceptance for load-building appliances, we asked all dealers to build up a fund for this purpose. Inasmuch as dealers do not compensate utility supervisors for their efforts, we felt that all dealers should deduct 5 per cent from the selling price of appliances sold through our assistance, and put this into a fund for the advertising of load-building appliances. This fund is kept in the dealer's own hands, and is used by him to advertise at various times specific load-building items which he merchandises.

The utility conducts a special display service prepared by a special staff to make window display layouts showing merchandise arrangements, trimming to be used, show cards, etc. The actual setting up of displays is done by the dealer, assisted by the territory supervisor.

The dealers are asked to file all prospects upon whom they desire protection, in a confidential file located at the utility company's office. This protects dealers on all prospects listed who are sold by utility company salesmen. These prospects are protected for 30 days before the utility supervisor can lend his assistance toward closing a sale to any other dealer, but during that month he must actively assist the dealer who filed the prospect.

These prospect cards are supplied without charge to dealers by the utility company. The file is continually culled and checked with the dealer sales report, by the new business manager. This report is filled out every Monday and mailed to the utility, and it gives the name and number of appliances sold during the preceding week. These reports are necessary to measure the results of the cooperative plan; to see that it is efficiently carried out; to maintain records that determine salesmen's compensation, and to plan home service follow-up of those appliances sold.

The new business manager conducts frequent pep meetings designed to instill enthusiasm and coordinate sales efforts. Plumbers and other gas appliance dealers are asked to send representatives to these meetings.

Under our plan there is an incentive for dealers to support a field sales organization. The number of salesmen need not be large, but, inasmuch as the amount of selling assistance the dealer receives from the utility company is proportional to the number of contacts he makes in the field, it is apparent that all outlets should have at least one salesman contacting the public.

Whenever the salesmen are in competition with our sales supervisors, the utility representatives immediately assist the dealer's salesmen to close the sale for their establishment.

It follows that:

1. The more salesmen a dealer has representing his company, the more times he runs into utility competition.
2. The more he meets this competition, the more the sales supervisor directs his selling effort to assist the dealer to make a sale.

Ask Your Plumber about

Automatic Hot Water

He will tell you that automatic hot water has become standard equipment in the modern homes he serves. He will tell you that only gas operation will give you hot water as you want it . . . . never-failing, clean, even in temperature, and low in price.

Let him estimate the cost of installing a Gas Storage Heater in your home. He will offer you dependable equipment at a fair price, on liberal terms. He is cooperating with us in providing alert, satisfactory service to users of modern gas appliances. Complete information on water heaters may also be had at our store.

Associated Gas & Electric System

LOCAL COMPANY NAME

An Example of Cooperative Advertising

3. The more this utility assistance is given to the dealer, the more sales the dealer can make.

Good selling talent is available at reasonable rates during these times. Men who, if properly trained, would become real salesmen are looking for work. We assist in training men for dealers through schools we conduct for that education.

It is possible to secure fine salesmen in many communities on a straight bonus or commission of 10 per cent, with a drawing account of $15 a week.

During the era of diminishing business returns, much stress is laid upon reduction in cost of distribution. Efficient management is making economies wherever possible. The investigator of this plan will readily point out that selling costs will increase because of the reduced volume of merchandise disposed of by the utility under this method of merchandising. While it is granted that sales volume will diminish, greater coverage will be had because of the added sales talent of the dealers. Consequently the gas company can reduce its field sales organization.

Interesting Figures

This is borne out by a comparison of the canvassing and soliciting expense for the last six months of 1932 and the same period in 1931 when the cooperative plan was not in operation:

1931		1932
Total Expenditures	$19,783	$15,959
Per Meter	.65	53
Per Dollar Added Revenue	.81	.58

We would also point out that our domestic sales costs during the operation of the cooperative merchandising plan are considerably under the pre-plan figures, including the cost of each dollar of added revenue. That is, the total selling expense for gas appliances, including advertising salaries, demonstrations, advertising supplies and expenses, and canvassing and soliciting, was:

6 mo. Period	1931	1932
Total	$26,715	$20,905
Per Meter	.88	.69
Per Dollar of Added Revenue	1.10	.76

The figures on expenses for selling both gas and electric appliances are even more satisfactory:

6 mo. Period	1931	1932
Total	$110,246	$69,569
Per Dollar of Added Revenue	1.17	.48

Canvassing and soliciting expense on electric appliances was decreased from $.87 per dollar of added revenue to $.35.

In connection with this reduction in sales expense, it is of interest that in October, 1931, there were 67 field salesmen; in March, 1932, after the plan had been in operation in the Ithaca territory about three months, there were 58, and on the first of this year there were 34, representing a reduction of nearly 50 per cent over the personnel working under the old plan.

Merchants Quick to Cooperate

Upon the inauguration of this cooperative program in the various communities, we found the merchants quick to appreciate the opportunities of this new form of merchandising. Following the announcement of the plan at an Ithaca group meeting composed of 40 representative dealers, suggestions began to pour in regarding methods of cooperation. Dealers throughout the territory enthusiastically started to put their shops in order in accordance with their agreements in the plan. Agencies for load-building appliances were secured, displays were arranged, and salesmen assigned to canvass and solicit business. Immediately, a noticeable reaction in company relations with dealers became apparent. Many who had been bitter in their criticisms of former utility activities were suspicious at first, but gradually the enthusiasm and confidence of other participants permeated their organizations and they fell into step.

In putting the plan in operation the retailer appeared to be the weakest link in the distribution system. Manufacturers and jobbers were performing their marketing functions rather satisfactorily, but little effort had been expended by them to educate the dealer outlet. As a result, the retailer, through failure to perform his function, was impeding the distribution of load-building appliances. Naturally, the gas company had to foster widespread dealer education through sales schools, meetings, merchandising letters and services, in order to develop independent aggressive outlets in the district.

Representatives of the new business department spent considerable time with dealers suggesting improvements in selling and storekeeping methods. Invariably, their reception upon the first contact indicated that the dealer did not desire this type of assistance. Tactful persuasion and constant effort to assist the dealer, however, have brought results, and many dealers are today incorporating newer and better methods in their business as a result of this service.

The plan in operation capitalizes to a certain degree upon the dealers' jealousy of competitors. If he realizes his competitor is going to take advantage of the utility company's assistance, he immediately perceives that he must do the same thing to stay in the merchandising field. If, previously, he were more careless in his merchandising efforts, now he must become more efficient or his competitor will get the business.

Quick to appreciate these changes in merchandising emphasis, the average dealer takes advantage of utility company assistance. If his competitor hires men to sell for him in the field, he makes every effort to do likewise. Also, when co-ordinating advertising, displaying appliances, and attending meetings, he is constantly on his guard to "scoop" his opponent, who, in turn, is carefully watching the merchandising moves of his competitor.

Very Good Results

Our books show, as a result of this dealer co-operative merchandising plan, that the utility's dollar sales volume for gas and electric appliances was $352,836 during the last six months of 1931, while in the same period of last year it had dropped off to $57,720.

In the six months between June 1, 1932, and December 1, 1932, our merchandise accounts receivable were reduced 40 per cent, or from $402,234 to $234,404. Undoubtedly the lack of any material amount of time payment sales influenced the result. During the same period the balance of the New York State Electric and Gas Corporation showed a reduction of 20 per cent, and the New York Central Electric Corporation 26 per cent. The reduction was much higher in the territory served by the Empire Gas and Electric Company.

As a result of the propagation of the dealer cooperation plan, merchandise inventories during the last six months of 1932 were reduced from $50,783 to $37,000. Yet on July 1, 1931, before the inauguration of the cooperative program, inventories were $184,077. They amounted to $87,466 when the Ithaca plan was started on January 1, 1932. Much of this lessening of money invested in appliances is due to the smaller stocks required under the dealer plan.

At present figures for the first six months of 1933 are only available on

the number of appliances sold by the utility and the dealers in comparison with last year, and a comparison of estimated annual revenue.

As a result of our increased efforts and enthusiasm for the promotion of dealer sales in the January-June period of this year, the gas revenue from appliance sales was stimulated to the extent of 89 per cent gain over the same period of last year. Estimated revenue from both company and dealer sales in the first six months of 1932 was $14,808, while this year it was $28,068.

In making the foregoing estimates, the unit sales of major appliances as reflected in the statistics for last year were claimed only when installed and verified by follow-up calls at the home.

Revenue was estimated on the following basis:

Appliance	Annual MCF	Annual Revenue
Range	6	$9.00
Refrigerator	18	27.00
Auto. Water Heater	36	54.00
Tank Water Heater	18	27.00
Space Heater	6	9.00

Unit sales by dealers increased heavily, the gain in both ranges and automatic water heaters being over 100 per cent. Tank heater, refrigerator, and space heater sales all moved upward among the dealers. Ranges and automatic water heaters showed a marked climb in sales with the utility company, but a much lower percentage gain than that registered by the cooperating dealers. Tank water heater sales, especially, slumped, because the utility representatives centered their attention on the major load-building appliances. The outlets for gas refrigerators remained stationary, while space heater sales by the company declined.

As evidence of the value of the plan, however, to the manufacturer, jobber, utility, and cooperating plumbers, hardware merchants, and others, our statistics show that combined unit sales of all appliances sold by both the utility and the dealers had a sharp upward trend over a year ago.

Combined range sales represented an increase of 115 per cent; automatic water heaters 104 per cent; tank heaters 62 per cent; refrigerators 38 per cent; and space heaters 21 per cent.

The gain in dealer sales appears to us to be remarkable. Range sales by cooperating dealers were up from 251 to 610, an increase of 143 per cent; automatic water heaters from 26 to 131, an increase of 404 per cent; tank heaters from 35 to 96, a gain of 174 per cent; refrigerator sales were nil in 1932, during the first six months, and this year there were five sales by dealers in the same period. In comparison with no sales of space heaters last year, there were 10 in the first six months of 1933.

Range sales by the company were up from 108 to 162, a gain of 50 per cent; automatic water heaters from 143 to 213, up 49 per cent; tank water heaters dropped from 30 to 9, off 233 per cent; refrigerator sales remained stationary at 13; while space heater sales declined from 19 to 13, a percentage of 46.

Total sales by both dealers and the utility were up from 369 to 772 for ranges; 169 to 344 for automatic water heaters; 65 to 105 for tank water heaters; 13 to 18 for refrigerators; and 19 to 23 for space heaters.

We believe that this large increase in dealer and utility unit sales is unusual, considering existing economic conditions.

Well-Timed Activity

With a desire to aid in the economic and industrial recovery of the country, we have conducted cooperative range and automatic water heater sales drives throughout the Empire-New York territory during the winter and spring. In between these organized cooperative sales efforts, we have continued to carry on a healthy, friendly, and stimulating program of cooperation between plumbers, department stores, hardware merchants, etc., and the utility, in the hope that more people may be put back to work in the manufacturing plants, and the buying power thus increased.

Due to the greatly reduced quantity of appliances which are now being sold by the company, repair expense will show a marked reduction in 1933.

It is difficult to enumerate all the beneficial results to be obtained by a dealer cooperative merchandising plan, since there are many intangibles, which are impossible to accurately measure. Dealer good will, greatly increased promotional activity through mass advertising, displays, systematic solicitation, and organized effort by a majority of outlets are but a few.

Through the experience we have gained through the operation of the cooperative plan during the past year, and the general pick-up in business conditions, we believe that the results for the year 1933 will exceed our fondest hopes of last winter. We are taking advantage of every opportunity to improve and develop the plan to the mutual advantage of the utility, the dealer, the manufacturer, and the jobber.

Notes on High Pressure Gas Distribution

(Continued from page 20)

new concrete is not as noticeable and there is not a jagged line of demarcation between old and new sections to attract attention.

When possible the distance from the property line should be only slightly more than sufficient to conveniently install the main and curb cock, as this will allow for future widening of the streets without relocating the main. This practice is not inconsistent with the disadvantage of leaks entering buildings without having far to travel, as a small leak will generally result in a complaint from the consumer and a repair can be effected before the leakage assumes a dangerous proportion.

A location so close to the property line that the caving of adjacent soil during the digging of a foundation for a building causes exposure of the main should be avoided, as settlement, trapping, straining or breaking the main may result. A contractor digging a foundation seldom considers it necessary to report exposure of a main unless breakage occurs and even then it is not uncommon to find that an attempt has been made to patch up the damage in a manner that is not permanent and causes considerable future trouble and expense.

Provision for Future Extensions—The running of stubs for future main extensions should be kept at a minimum. In place of a stub ending in a valve, some follow the practice of placing a tee, either plugged or butt-ended, on each side of intersecting streets not originally served, to eliminate the necessity of cutting a main for future connections, but unless this tee is of welded construction throughout it may be source of leakage. It is preferable to plan for double maining a street rather than installing a number of service stubs to undeveloped lots.

Diaphragms

Source, Selection, Grading and Treating of the Leather for Gas Meters and Regulators - for Artificial and Natural Gas

By **ROBERT L. KLAR**

Engineer, Des Moines Gas Company

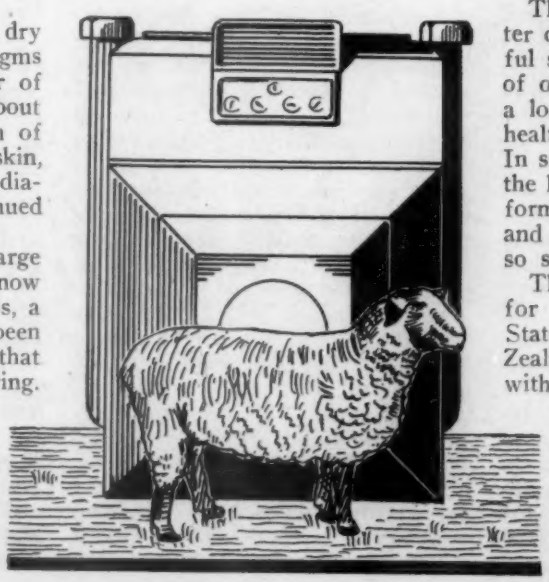
I HAVE been collecting data on the manufacture of diaphragms, treating the subject from beginning to end in an effort to determine, if possible, the answer to the question, "Why do meters become inaccurate?" In the first place, I would like to say that the meter companies of this country have cooperated in a very fine manner and there is no question but what considerable care has been used in the selection of leather and the rest of the work to produce a good meter diaphragm.

In this discussion that I have prepared, no reference is made to any one of the companies. Paragraphs in their entirety have been taken at random from the papers received, and for the most part all of the companies are in agreement. I present this information to you for your consideration, and will let you be the judge as to whether or not we need to go further for the answer to our question.

During the early years of the dry meter manufacture, the diaphragms were made of linen or silk, or of both, oil treated, but beginning about 1825 light leathers in the form of sheepskin, lambskin, and calfskin, were adopted as a standard diaphragm material and have continued as such up to today.

With the exception of a few large capacity meters, the material now used is the true lambskin, that is, a skin from a lamb that has not been sheared, or the skin of a lamb that has recently had its first shearing. The exception is for large capacity meters where it is necessary to use a skin of large area or a certain thickness, in which case sheepskin or a calfskin is used.

Sheep are produced in practically all countries except the frigid zones, with the exception that Japan has no sheep, and that Iceland produces sheep on the Southern and Eastern shores. Sheep in the torrid zone are poor in wool quality, and the wool approaches more the type of hair, similar to a goat. The exception to this, of course, is in the higher altitudes where a more woolly type is raised. Big producing areas of sheep are Australia, the United States, South Africa, New Zealand, Argentine, Russia, India, England, and France. The primary purpose for the propagation in the temperate civilized countries is for the production of meat or wool, and the type of sheep peculiar to a country, or a section thereof, is based on either of these two uses. Sheep may be classed, therefore, as having the following characteristics: good meat with good or medium wool; medium meat with good or medium wool; poor meat with excellent, good or medium wool. The determining factor of a particular class of sheep is its ability to produce good wool or good meat, as a result of good breeding. The resulting hide or skin that remains after the primary purpose has been fulfilled is largely a matter of secondary choice, and the users of sheepskin are handicapped by the fact that this product of nature is not produced for its specific use.



Sheepskin is universally used as a gas meter diaphragm material. The smaller skins are more suitable for small meter diaphragms, while the larger skins, which are thicker, and consequently, firmer, are better adapted for large meter diaphragms.

The leather, which is used in meter diaphragms, is obtained by careful selection, beginning at the point of origin. This first point is from a locality where conditions tend to healthy flocks and skillful shepherds. In such an environment the pelts of the lambs become smooth, firm, uniform in texture and free from cuts and incisions common to flocks not so skillfully tended.

The type of sheep (lamb) used for diaphragms, in the United States, is confined to American, New Zealand, and South American skins with perhaps an occasional batch of Iceland and Capes being used if the characteristics are acceptable. America produces two major grades of sheep, classified for the closeness or openness of the wool. New Zealand pro-

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duces one type of shep and South America one general type.

Most of the American sheep for meter purposes are the product of the packing houses. Most of the New Zealand sheep for meter purposes are the product of the packing and icing plants, and this holds true also for South American. The country butcher and small packing plants outside of the large packing centers produce a small quantity of negligible amount. The American taste for sheep is largely for the spring lamb type, and this is true also to a large extent in England, to which country most of the New Zealand iced carcasses are sent. This results in a large production of sheep skins under or approximately one year of age, and it is from this selection that the pelts are picked that eventually go into meter diaphragms.

Why Skins Vary

There are peculiarities, however, in the life of the sheep that differ amongst the three principal producing countries in which we are interested. There are also peculiarities of packing house methods that have a bearing on the finished product. There are factors that enter into the life of a sheep that determine its usefulness for meter leather. This is the amount of wool that the sheep carries during its natural life and which affects the structure of the skin due to the weight of the wool and the amount of foreign substances that attach themselves to the wool and work into the skin. This results in the presence of what is known as "rib," in a finished piece of leather, which is as its name implies, a ridge of harder and thicker material than the balance of the skin, and also results in a looseness of the structure. The material picked up and entering the skin, such as seeds and burrs, thorns, and resulting scratches, result in a damage to the grain of the finished leather. Occasionally a certain parasite will attack open wool skins, causing a puncture which shows in the finished leather, and occasionally small parasites attack close wool skins, causing blisters to appear on the finished leather. Sheep that are too closely confined without a free range will develop a digestive action that causes small hard spots to appear on the finished leather.

Carefulness or carelessness in removing the pelts and the subsequent de-wooling will cause looseness in the structure or defects showing upon the flesh side of the finished leather. The American packing houses' product is split directly down the belly and is taken off with the greatest amount of care. New Zealands are split on the side, but are generally free from knife removal marks. South American take-off is varied, both good and bad showing in the same shipments. The New Zealand skins are prone to show the effects of housing and are, therefore, much more likely to contain cockle.

Cockle is a skin defect in the sheep and results in a loss of even pattern in the grain. While small amounts of it are not injurious to meter diaphragms, large amounts seem to be bad, and consequently cockle is carefully watched for. The leather at these points semes to be a little bit harder, but this is very difficult to determine at times. However, the particular points where cockle has been active do not absorb oil very readily and are, consequently, a hindrance to manufacturing processes.

There is no particular sorting made in the packing houses for the particular type of leather needed for the meter industry, and the tanner, in purchasing his supply, has to be governed in the beginning largely by the general characteritics of the skins and depends upon his own sorting as to the ultimate pieces that he will tan for meters. As a result of this, if a continued uniform source of supply is wanted, it is necessary that meter leather be purchased from a tanner who handles a sufficient volume of general skins so that the proper sorting can be made.

Preliminary Tanning

The skins are usually received in the tanneries in a salted condition and are practically free from wool, the animal having been sheared before slaughter. In the preliminary treatment in the tannery, they are worked up like other skins, the process being, in general, to open up the leather and put it in a proper condition to receive the tanning.

We know of no meter leather used in the United States that is not the product of a packing house or icing plant, and the following method is, therefore, the standard preparation: After the animal is killed, and the heat has left the pelt, it is thoroughly washed and a depilatory is applied to aid the removal of any remaining wool. This depilatory may be lime, sulphide, arsenic, or a combination of these. Within a short time, to prevent resulting looseness, the remaining wool is then generally removed by machine, and the pelt is run through another machine for the removal of bits of flesh that may remain. It is necessary to counteract the effect of the depilatory and a solution that will become soluble with the lime is applied. This may consist of solutions of boracic, hydrochloric, or lactic acids, or a combination of these with bi-sulphate of soda and ammonium chloride in the form of patented solutions, known to the trade as bate. The pelt with the solution is placed in a revolving barrel or drum and is so run for a period of time until the lime action has been neutralized. This action also causes the removal of the epidermis. The pelts are then placed in an infusion, generally of bran or flour, which is not, however, done in all cases; the object being in some particular cases to bring them into a slightly acid condition, so that they may become receptive to the operation of pickling.

Pickling Procedure

Pickling liquor consists of a solution of a small percentage of sulphuric acid, salt and water, and is used for the purpose of preservation and to retain softness. Pickling is carried out by the packing houses and from this point the tanner begins his operations. There are two methods of tannage for Amercan meter leather but a preliminary amount of work is common to both. The pickled skins are carefully sorted for weight and defects, both natural and packing-house, and it is to a large extent that this selection determines the usefulness of the resulting leather. The pickled skins are then piled in a hydraulic press and the natural sheep grease is removed, and the skins are soaked for the removal of the pickle liquor. They are then tumbled for a short time with water to soften them and to allow them to receive the tan liquor which is done in a following operation.

Sheepskins are more receptive to a tanning material made of Hemlock, and the result in the leather is of better quality than any of the other vegetable tanning materials, and this material is to be desired if done by the old fashioned steeping of the bark and tanning in a still pit. Hemlock bark is cut from the tree during the winter months in the form of cords and is stored in the tan yard until such time as needed. This bark is then ground and steeped with steam and hot water and is allowed to settle in pits and is drawn from the tanning pits as needed.

The skins are placed in used, weakened solutions and gradually move forward day by day until the

strongest liquor is applied. If a full Hemlock tanned leather is to be used, this tannage should not be less than nine or ten days and should be done in pits in which the water has no artificial circulation. This is called the still pit tannage.

Substitute methods of tannage use either bark extracts containing mixtures of Hemlock or entirely without Hemlock in which a stronger, quicker action tanning agent is employed, and still cheaper methods of tannage are to either agitate the water in the pits to shorten the time of tannage, or to tan them in revolving drums to cut down the tanning time. The still pit tannage is necessarily the most costly, but is desired because of the proper lay-down and tightness of the fibres. The tanned skins are then struck out on a rolling machine to remove the loose ends of flesh and to help remove the tan liquor.

Bark-tanned meter leather is tanned in still baths, the skins being hung in racks in a weak tan bark solution. They are advanced through successively stronger tanning solutions and after about two weeks will be thoroughly tanned. It is claimed that the still bath method is better for meter leather since the skin is not worked mechanically and, as a result, is firmer.

The operation of drying is then performed preferably in an open room in which the temperature is controlled, by tacking the skins on boards and allowing them to dry to stiffness. A shorter, cheaper method of doing this is to force the drying on frames in an artificial dryer in which the temperature is stepped up to almost the critical destructive point. The bark tan skins, in this dry condition, can be kept for a long period of time, provided temperature and moisture content in the storage is carefully watched. In the straight Hemlock tannage, the skins then go through a softening roller, are dampened, and a mixture of stuffing oil is applied and the skins are tumbled for a short period of time so that the finishing oil can be beaten in. The skins are then lightly stretched over a U-shaped staker which aids setting the stuffing oil and gives the required softness. The skins are then sorted for weight and are ready for diaphragm use.

Skins that are semi-chrome tanned have the preliminary tannage of Hemlock, but the period of tannage is cut to about two-thirds of the regular time and the skins are dried under similar conditions until needed. The re-chroming bath consists of a solution of chrome salts, the strength depending upon the receptiveness of the skin to receive the tannage and the weight of the pack, and is applied in a revolving drum and continued until the basicity desired has been reached. The skins are then removed from the drum and neutralized for a period of approximately twenty-four hours and are then treated as are the full Hemlock tanned skins.

Following the tanning, the skins are washed and fat liquored. Fat liquor is an emulsion of oils in which the leather is tumbled. The skins absorb the oil quantitatively from the emulsion and are rendered soft and flexible. The characteristics of the dry skin are quite dependent on the fat liquoring inasmuch as the amount of fat liquoring regulates the firmness. Ten or 15% of fat liquor by weight will make a relatively firm skin suitable for tin meter diaphragms, while 40 to 50% will make a very limp skin suitable for other kinds of diaphragms.

Wherever a meter sheepskin is tanned, it is usually conducted as a separate process because of the special requirements. The only kind of leather that is tanned along with meter leather is the so-called roller leather which is used for covering the rollers on spinning machines which draw the fibre to make the thread. In selecting these skins a little more attention is paid to the grain surface than is required for meter leather. Otherwise, there is practically no difference between the skins.

After the tanning process is completed, the skins are again sorted and those considered most suitable for use are transferred to a separate plant, where they are put through a process of finish and selection. In the finishing process, certain ingredients are worked into the leather, the amount of which is limited only by the necessity of holding the finish to the point where it will not interfere with the operations of cutting, pasting, sewing and winding incident to the fabrication of the leather into a diaphragm.

This finishing process is costly, as no expense is spared to obtain a uniform result and to turn out leather highly suitable and best adapted to the purpose for which it is intended to be used. After practically more than thirty years of continuous use of this leather, and with an exhaustive research, which has included an examination of every known

(Continued on page 49)

BESSE, OSBORN & ODELL INC. · COLONIAL BRAND · BOSTON, U.S.A. · RE-CHROME METER LEATHER

Used by many of the large Gas Companies and Meter Manufacturers.

Besse's leather is fully hemlock bark, pit tanned and naturally dried. We leach our bark in our Maine tannery. It takes us a minimum of five weeks to tan our leather.

RECHROME METER LEATHER

After this leather has been fully tanned in hemlock bark, we then reprocess it into Rechrome Meter Leather, which leather has proven so valuable to many gas companies.

RECHROME LEATHER

will stand up in the meter under all variable conditions, heat, cold or dampness, without affecting the diaphragm in any way.

We unqualifiedly recommend its use by all Gas Companies

BESSE OSBORN & ODELL, INC.

51 South St., Boston, Mass.

Tanners of "Colonial Brand" Oil and Re-Chrome Meter Leathers

New York Representatives

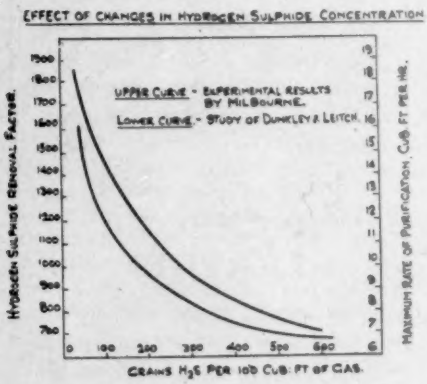
G. N. BANKART—W. A. SMITH

177 William St., New York City

Technical Digest

PURIFIER DESIGN

The derivation of a formula for the calculation of purifier dimensions is discussed. Certain factors cannot be incorporated in this formula, as for example the temperature and humidity of the gas and the alkalinity and the moisture content of the purifier mass. Experience has shown that the best results are obtained in purification when certain optimum values of these factors are maintained. Concentration of sulfuretted hydrogen in the gas and activity of the iron oxide can be related in a formula. A basis of four to five cubic feet of iron oxide for every 1000 cubic feet of gas treated per day is used in the design of the purifier after due correction has been made for variations in the concentration of sulfuretted hydrogen in the gas and activity of the oxide.

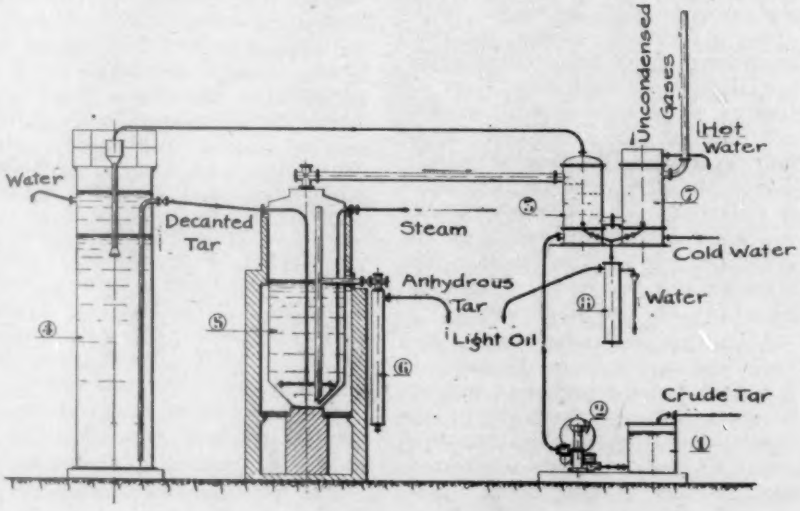

EFFECT OF CHANGES IN HYDROGEN SULPHIDE CONCENTRATION
HYDROGEN SULPHIDE REMOVAL FACTOR.
MAXIMUM RATE OF PURIFICATION, CUB. FT PER HR.
UPPER CURVE - EXPERIMENTAL RESULTS BY MILBOURNE.
LOWER CURVE - STUDY OF DUNKLEY & LEITCH.
GRAINS H2S PER 100 CUB. FT OF GAS.

Certain experiments carried out on the sulfiding reaction, the results of which are shown in the accompanying illustration, suggest that the time contact necessary between gas and purifier mass is proportional to the square root of the hydrogen sulfide concentration. Thus doubling the concentration of hydrogen sulfide necessitates an increase of 42 per cent in the size of plant. According to the square root relation, this would be 41 per cent. Time contact necessary for revivification is also a function of the square root of the concentration of sulfuretted hydrogen in the gas when revivification is carried out in the purifiers themselves. Rate of reaction is directly proportional to the activity of the iron oxide, which is a function of the active iron oxide in the material and its weight per unit volume. If A is the activity, F the content of active iron oxide, expressed as a percentage of the weight of the material as used, and W is the weight of unit volume of the material, then $KA = FW$, in which K is a constant. If R is the ratio of volume of material to that of gas passing in unit times, then $R = \frac{1}{A\sqrt{}}/S$, when S is the concentration of sulfuretted hydrogen in the gas. The formula is finally written as $R = 4.05/FW\sqrt{S}$, where the units are cubic foot, pound and hour.

—Proteus. Gas Journal, volume 203, 1933, page 51.

DEHYDRATING HIGH WATER CONTENT TARS

Dehydration of tars containing large quantities of water is a very delicate operation, as great care must be taken to avoid local explosions and violent boiling over of the tar. The process described by the author depends on the principle that the water is vaporized in the body of the tar itself. The apparatus used for this purpose is shown in the accompanying illustration. The crude tar is fed into the apparatus through a regulator (1), which is provided with a float valve, assuring a constant level therein. A feed pump (2), whose delivery is regulated as well, pumps the tar into the preheater (3), where the heat in the vapors, derived from the dehydration process, is recovered. Then the tar goes to the continuous decanting apparatus (4). This apparatus removes a certain proportion of the water contained in the tar and this water collects at the upper parts of the apparatus and is removed by means of a suitable decanting device. The decanted tar, which is quite hot, flows into the dehydrating apparatus (5), where it is atomized into a mass of dehydrated tar which returns to this apparatus, and, in which the volatilization of the water content of the wet tar, produces the required agitation. Sometimes the injection of steam is required in this process. The vapors of water and light oil escape through an opening in the upper part of the apparatus and are cooled in the preheater (3) and finally condensed in the condenser (7). The condensate is sent to the separator (8) where the water is separated from the light oil and each product is removed separately. Uncondensable vapors are discharged into the atmosphere. The dehydrated tar is removed at the bottom of the dehydrating apparatus, flowing out regularly through a siphon tube. Care must be taken to proportion the flow of crude tar into the apparatus in such a manner that the tar that is finally removed from the dehydrating apparatus itself is sufficiently dehydrated to meet requirements. The quantity of tar that can be processed in the installation will naturally depend on the quantity of water it originally contained. It is claimed that apparatus, working on this principle, can process five tons of tar per hour, such tar containing as much as thirty per cent water. *—C. Ab-der-Halden. Journal des Usines a Gaz, 1933, volume 57, page 368.*

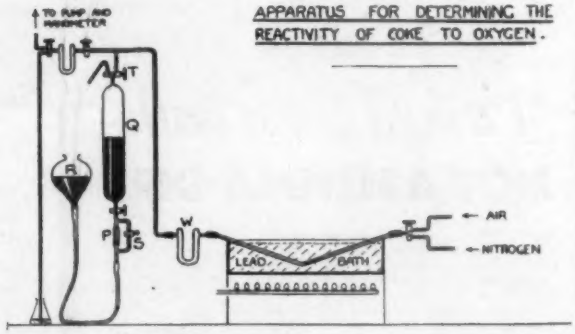


REACTIVITY OF COKE

The usual method for the determination of the reactivity of coke to carbon dioxide is not suitable for cokes prepared at low temperature, because of the changes they may undergo during preheating and testing. A modified procedure has been adopted involving a preliminary evacuation at, for example, 600 degrees C. over a period of six hours and the collection of a test sample over a period of one hour. Even then the quantities of carbon monoxide formed were very small, and it is more practical to determine the reactivity of a coke at low temperature with reference to oxygen rather than carbon dioxide. For this purpose the disturbing influence of exothermic heat is eliminated by the use of a lead bath. The reactivities to oxygen of a series of carbonized fuels of gradually diminishing oxygen content and carbonized at different temperatures were determined and tabulated. In this series (including lignite, bituminous coal and anthracite coal) the fuel containing more oxygen, or carbonized at the lower temperature, gave the more reactive coke. Comparisons were also made between the reactivities and ignition points of the different cokes, indicating a close correspondence when the "second" ignition points were used. The process of slow gasification at a temperature of 380 degrees C. in oxygen of a 600 degree C. coke made from bituminous coal was followed for nine hours. The percentage of oxygen in carbon monoxide and carbon dioxide soon attained and maintained a fairly steady value, while the rates of hydrogen consumption and of oxygen fixation by the coke diminished rather quickly at first and slowly thereafter during the gasification. The apparatus, which was used for the determination of the reactivity of coke to oxygen, is shown herewith. In order to sample the gas continuously at a slow rate, the flow of mercury from the sampler (Q) to the vessel (R) was checked by the capillary (P) and regulated by the head of mercury, which could be varied by means of a ratchet and pawl.

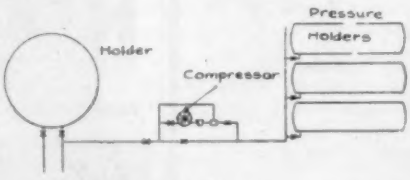
—C. B. Bolland and J. W. Cobb. Journal of the Society of Chemical Industry, 1933, volume 52, pages 153 to 159T.

APPARATUS FOR DETERMINING THE REACTIVITY OF COKE TO OXYGEN.



PRESSURE HOLDERS

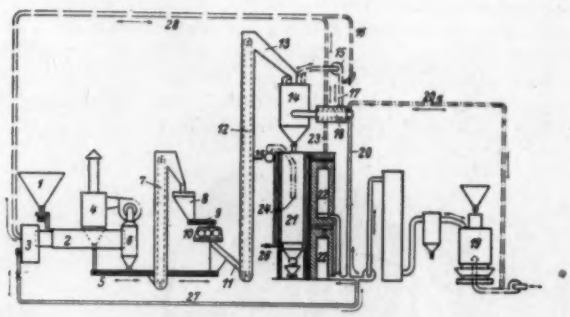
Advantages of the high pressure holder over the ordinary holder are summarized as follows: The ground space required is less than for ordinary holders in the ratio of approximately 6 to 10 in the case of the small holder, although the gain is not so great in the case of larger holders. As regards ground space, additional economies may be gained by superimposing the pressure holders one above the other as is shown in the accompanying illustration. Installation costs are less with the pressure holders. Heating is not required in winter. The function of the pressure holder used in connection with the ordinary holder is to balance the fluctuations in demand, and to provide a reserve for contingencies. The installation, shown in the accompanying illustration, comprises three pressure holders, each 38 feet 6 inches long and 10 feet external diameter. Their water capacity is 2825 cubic feet per holder. The working pressure is 115 pounds per square inch absolute, and each holder can store 22,600 cubic feet, of which 19,775 cubic feet are released when the pressure is reduced to atmospheric.



—Bernard Delaruelle. Journal des Usines a Gaz, 1933, volume 57, page 358.

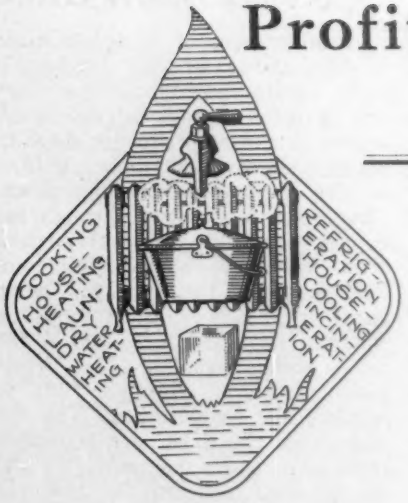
GAS FROM LIGNITE COAL

A rather thorough study was made of the status of gas production from lignite coal in Germany. A new process has been developed, known as the Seidenschnur method, which is shown in diagrammatic form in the accompanying illustration. The crude coal enters through the hopper (1) and passes through a drum dryer (2) heated with combustion gases, the fuel gas being burnt in the mixing and combustion chamber (3). Producer gas is fed to (3) through the line (27). Waste gases are added through (28) to regulate the temperature. The vapors from the dryer are separated from dust in the separator (4) and the dry dust falls into the conveyor (5) and is added to the main flow of dried coal from (6) which is carried up by the conveyor (7). The material is fed over the bunker (8) and by means of the conveyor (9) to the briquetting press (10) and the briquets pass over the inclined screen (11) to the conveyor (12). The briquets drop down the inclined conduit (13) where they are preliminarily gasified and enter the furnace (14) where they come in contact with hot gases at 300 degrees C. Part of the carbon dioxide and sulfuretted hydrogen is removed from the coal without the briquets decomposing. The gases are sucked off by means of the exhauster (15) at times through the lines (16) and (28) to (3) and at other times for the same purpose through the line (17) to the combustion chamber (18). This chamber also receives producer gas from the producer (19) through the line (20) and combustion air through (20a). The main part of the carbonization is conducted in the vertical chamber (21) provided with regenerators (22). The properties of the gas made are described in detail.



—Dr. R. Heinze. Das Gas und Wasserfach, 1933, volume 76, pages 378 to 386.

Profitable Pointers



WE are and always have been interested in carefree hot water service and whenever we see a hot water advertisement we read it, no matter how good or how bad it may be. We are always looking for a new slant that will sell Gas Water Heaters and when we find an idea that has a new "wallop" we clip the advertisement and consign it to our files where we can lay hands on it when the occasion demands. Some time ago we ran across a couple of advertisements in the Pittsburgh papers that had the aforesaid "wallop." They are so unusual that we are going to pass them on to *American Gas Journal* readers. We do not know who wrote either of these advertisements but they both have that old kick in them that we well remember having seen in "Instantaneous" water heater ads, in Baltimore, Washington, Philadelphia and down in Columbia, South Carolina, in the days before we decided to make the world safe for democracy. We often wonder why gas men did not figure out some way to keep-everlastingly-selling instantaneous hot water service. "A cubic foot of gas will heat one gallon of water to a rise of 70 degrees and cost—" Catch on? Wasn't that a sales talk? Again referring to these advertisements and the men who wrote them, we think we can guess the initials of the man who coined the "henna-dip" idea, and, if you ask us, it's a good one.

Every wife knows that we husbands are a "strange breed of cats." We put up with all sorts of inconveniences in the home, as a matter of habit or maybe we think we are being economical.

There is no greater inconvenience in the home today than fooling around waiting for hot water, climbing up and down to light or turn out the heater, and we generally lose our temper in doing it.

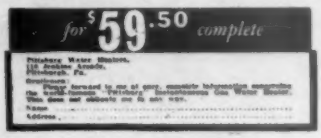
The husband who puts up with this for another day is actually throwing away dollars when he can have a genuine Pittsburg Instantaneous Water Heater and rust-free hot water wherever and whenever he wants it . . . for no down payment and the first monthly payment begins in October.

For an explanation of our special plan use the coupon below.

Pittsburg Water Heaters

110 JENKINS ARCADE, Ground Floor GRant 5410

A GENUINE PITTSBURG INSTANTANEOUS WATER HEATER



BATH!?
"I asked for a bath—
NOT A HENNA-DIP"
YOU'LL have to get used to those henna-dips if you're going to hang on to that old rusty hot water boiler of yours much longer. You'll have to learn to take rusty baths and like them and get used to rust in your hair and rust-spots on the laundry.
That's the penalty for not owning a RUUD Rust-Free Automatic Water Heater. Here are others: water too hot or too cold, gas waste, high maintenance cost-per-year, short life and trouble, trouble, TROUBLE!
Trade it now while prices are still low for RUUD Perfect Hot Water Service, crystal-clear and rust-free, instantly and inexhaustibly ready, long-lived and low-cost.
PRICES MUST ADVANCE
Copper and other metals of which RUUD is made have risen sharply. Forty-handed buying permits us to keep RUUD prices at the old low levels, but only while old stocks remain. To buy now is to save money, for prices must surely advance . . . and soon!
RUUD
444 Oliver Avenue ATlantic 5586
Opposite Wm. Penn Hotel
DEMONSTRATIONS DAILY
$63.50 AND UP
ALL SIZES REDUCED . . . ALLOWANCE FOR YOUR OLD WATER HEATER . . . EASY MONTHLY PAYMENTS . . . 20 YEAR COPPER COIL GUARANTEE . . . MANY NEW IMPROVEMENTS
THE COPPER-QUALITY-RUUD

ONE of the most successful cooperative sales activities we have heard of in some time was staged last summer by the Ottumwa Gas Company, Ottumwa, Iowa. The campaign consisted of a big spread in the newspapers, starting with a full page in which the names of the merchants cooperating were all featured along with a story of the value of cleanliness and the use of soap and HOT WATER.

In all there were about fifty firms cooperating in the drive to sell cleanliness and, of these fifty, twenty-four built timely window display advertisements to tie into the campaign while three arranged attractive displays on the floor of their stores. The campaign lasted for ten days

Drug Store Window During Campaign.

and, according to R. D. Burmaster, Sales Supervisor, it attracted more attention than a three-ring circus and resulted in a new "high" in the sale of automatic hot water service in Ottumwa, to say nothing of its value in promoting the cleanliness

Chain Grocery Window Display.

idea, which just can't be successful without carefree hot water service in the home—all of which means the sale of more water heaters and an appreciable increase in the sale per domestic meter which all gas men are so earnestly striving for these days.

WHILE all gas men cannot employ an artist to build their window display advertising, they can plan their displays. In planning these displays there are nine factors that must be given due consideration:

1—*A power to attract.* The power of attraction may be gained in several ways: motion in the actual display; motion in light arranged to arrest attention; or by colorful backgrounds that suggest usage.

2—*Seasonable and original.* The seasonable display ties in with the season of the year in which it is built—New Year, a national, state or local holiday or event.

3—*Power of persuasion.* Every merchant should strive to build some suggestion of usage and desirability into his displays. When he has his plan finished he should ask himself, "Would this display create desire in my mind, wish me to own the merchandise displayed?"

4—*Good light.* Good lighting is a very essential factor to good displays. Good lighting costs very little and no display can be effective without it. If your window has shadows and you do not know how to arrange your lights to eliminate them, consult a man who makes lighting his business. It will cost no more to have proper efficient light, and in many cases it will cost less.

5—*Cleanliness.* Above all, see that the window and glass are carefully washed and cleaned before any attempt is made to install your display or merchandise. This may seem to be an obvious point, on the other hand it is one that we must not overlook.

6—*Change.* Strive to make each and every display a change in its entirety; that is, if the display you install this week is centered in your window, build one next week that will spread diagonally across your window. This gives your window that "different" look that has a power of attraction.

7—*Color.* Plan your colors with the idea of harmony; nothing is more repelling than a jumble of clashing colors. Get enough color into your displays to attract, but strive to make your colors harmonize. Seasonable color is always effective.

8—*Do not crowd.* Windows that are cluttered up do not attract, they confuse. This is particularly true of such merchandise as gas ranges with washing machines, and refrigerators with water heaters—they just do not belong in the same display.

9—*Background and wings.* The background and window accessories should be planned to be a part of the display, not just something to fill-in the window. Strive to make these parts emphasize the usage of the appliance being featured.

IF you wish to help your cooking load, play up the advantages of gas cookery in every way known to you. Newspaper advertising featuring items of food, with a tested recipe and the advertised fact that they are better when baked at home and cost less always, begets attention. We re-

cently saw a series of lay-outs that features a number of popular recipes for home baked foods that were headed "Home Made Cakes 5c—Pies for only a fraction of a cent," etc., etc.

A MID-WESTERN gas company that is paying its meter readers $1.00 for each dead service that they revive reports that the plan is working very well. The salesmanager who devised this plan, to build up a sagging domestic sales curve, informs us that these men not only have revived many dead services but that they have turned in many live leads that resulted in the sale of various appliances.

A SOUTHERN company that found merchandise sales lagging and commission salesmen discouraged and hard to secure, organized the entire personnel into a sales unit. In the first place, a canvass was made to ascertain just what appliances each employee was using; this done, a special employee price was made on all appliances and an effort was then made to sell the employees appliances that they could profitably use. This drive was carried on for a period of two weeks and after the activity was closed the plan to make every employee a sales agent was inaugurated. The big idea says the salesmanager is "to get our people to thinking and talking more about gas appliances and gas service. We compensate them in two ways; for direct sales and for leads that are turned into the sales department that result in sales within thirty days.

EQUIPMENT NEWS

New Humidity Controls

The Minneapolis-Honeywell Regulator Company, Minneapolis, Minn., announces new type relative humidity controllers. Built in various models providing for different electrical circuits and available with or without relative humidity indicators, this new line offers accuracy and sensitivity in the control of humidity not heretofore available in units suited to domestic or small commercial installations. Actuated by a hygroscopic element composed of multiple groups of human hair a simple lever mechanism transmits the motion of the expanding and contracting element to a mercury switch which, in turn, operates the humidifying or de-

humidifying equipment. Ample electrical capacity is available for the direct control of line voltage solenoid water valves or small motors. With other circuit arrangements motorized valves may be controlled, or when using the Humidity Control as a pilot control of a magnetic starter, larger loads may be controlled, limited only by the load rating of the starter.

Designed particularly to meet the needs of room control of humidity they are arranged to provide accurate control and to perform dependably over long periods of time. Models are available with indicators built in their covers to show at a glance the relative humidity in the room.

Although constructed for setting over a range of 20% to 80% R.H. the settling point is internal and not subject to tampering by persons unfamiliar with humidity requirements. The covers enclosing the control mechanism are of the locking type requiring a special key to provide access.

These Humidity Controls will, under conditions of normal rate of increase or decrease in relative humidity, control within a total variation (differential) of 2%.

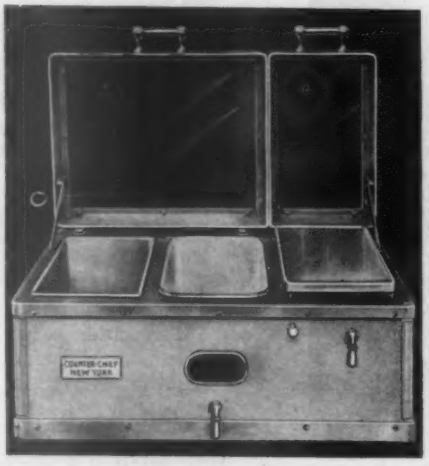
Oxweld Pipe Cutting Machine Introduced

Another new cutting machine has been announced by The Linde Air Products Company, 30 East 42nd Street, New York, as an addition to its Oxweld line of apparatus, known as the Oxweld Pipe-Cutting and Beveling Machine. It consists of a center rod with three spreading arms which press against the inner wall of the pipe, holding it in position, with an arm supporting a blowpipe that can be adjusted to the desired angle of the cut. The blowpipe and arm rotate without the use of a crank for quick centering of the device, and by means of a crank when doing actual cutting.

This machine will take almost any hand-cutting blowpipe, is readily portable, and its operation is extremely simple. Once centered in the pipe, the operator merely turns the crank causing the blowpipe to rotate evenly around the pipe, making a clean machine-like cut. Wherever large quantities of pipe are to be cut and beveled, this machine will save time, money and trouble.

New Counter Griddle

"Counter-Chef," manufactured by Counter-Chef Corporation, 601 West 26th Street, New York, is an attractive glass-enclosed griddle for the sanitary preparation of frankfurters and various other short orders. It is a compact, tri-



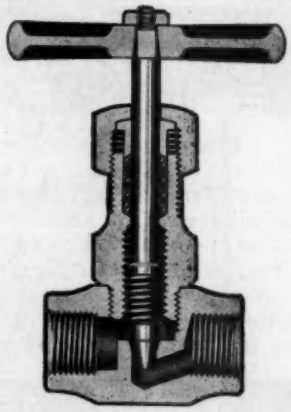
sectioned cabinet 30" long, 16" deep and 13" high and does not require extra glass enclosures.

The central section consists of an enamelled container which keeps frankfurters heated indefinitely. The roll container has a capacity of approximately 60 rolls and is perforated so that the rolls are always in a heated condition. The griddle is made of cast iron with a grease rim. The central and left hand sections are enclosed in a plate glass top. A separate plate glass top also covers the griddle plate. Air space is provided so as to prevent moisture condensation and allows full visibility.

A powerful "U" Burner is used only when required for grilling and heats the griddle plate instantaneously. A safety lighter is operated by a push button attached to the heating apparatus. It is artistically designed and the castings are made of polished aluminum.

High Pressure Needle Valves

Crane Co., Chicago, Ill., has placed on the market a newly designed line of high pressure needle valves which have been made as small and compact as possible without sacrificing efficiency or quality. Their sturdy, rugged construction makes them suitable for service where measuring pressures or volume of flow of fluids or gases is done, and where a very gradual release of pressure is necessary to prevent damage to such delicate instruments as pressure gauges and meters.



Particularly adaptable to high pressure gauge lines on oil service, these valves can also be used on water or gas lines, orifice meters, regulator leads and by-pass connections in power, industrial or chemical plants, in refineries, or on gas and gasoline distributing systems where high pressures at relatively low temperatures are encountered.

Designed to give maximum efficiency in any service for which they are recommended, these valves have many practical improvements such as long pipe threads with liberal engagement in all positions, unusually deep stuffing box with gland, tight metal to metal bonnet joint, long tapered plug disc, extra long bonnet thread.

New Combustion Test Set

The Hays Corporation, Michigan City, Ind., announce a new combustion test set. This set combines the Hays CO_2 analyzer and the Hays dry type pointer gage, and is enclosed in a welded corrosion resistant steel case. The entire set weighs nine pounds. There are convenient reels and clamps for the rubber tubing and accessories. A test can be started as soon as the case is opened, as there is no leveling of the instrument which can be hung on a nail or placed on any flat surface.

NEWS of the GAS INDUSTRY

Employees of Northern Indiana Public Service Company Form Union

Headquarters for the newly organized utility workers' union in northwestern Indiana has been established at Gary, Ind. The organization consists of about 450 employees of the Northern Indiana Public Service Company. James Slattery, organizer, said headquarters would be maintained at 515 Broadway. The Indiana group is affiliated with a similar group in Chicago, it was said. Thus far there has been no open antagonism on the part of officials of the company, which deals in electric current and gas in many cities and towns.

Ozark Pipe Line Co. and Citizens Gas Co. Sold

Ozark Pipe Line Co., and its affiliate, the Citizens Gas Co., Parsons, Kans., have been purchased from Fred Garrison and a new corporate organization established with the following directorate: A. S. Hopkins, president. E. A. Warren, secretary-treasurer; both of Neodesha; with three additional directors, S. H. Hale and Hugh Edward Hale, Independence, and David Flynn, Kansas City.

A. S. Hopkins, president, is former president of the Standard Oil Co., of Kansas. Mr. Warren, secretary-treasurer, held similar office with Standard Oil of Kansas for many years and until recently has been vice-president of that company.

Research of Heating at Mellon Institute

According to an announcement by Dr. Edward R. Weidlein, Director, Mellon Institute of Industrial Research, Pittsburgh, Pa., the Multiple Industrial Fellowship on heating, sustained in the Institute since 1929 by the National Radiator Corporation, Johnstown, Pa., is continuing actively a number of investigations of interest to heating specialists as well as users of heating equipment. In addition, the Fellowship, whose incumbents are Dr. J. L. Young and Mr. A. C. Jephson, has been lately according more and more research attention to certain problems in air conditioning and also to the development of new products.

After a thorough investigation of ferrous and non-ferrous heating units, the Fellowship has found that cast iron is the most suitable metal for the construction of finned convectors. Results of work on impregnated wood foundry patterns, now fully patented, are likewise of interest to heating industrialists; this development is of broad application in the foundry field. During the past three years the Fellowship has been engaged in the development of corrosion-resistant materials especially for use in the petroleum and other process industries, conducting this investigation in collaboration with the research department of the National Radiator Corporation. During the course of these studies the findings of the International Nickel Company respecting the place and utility of "Ni-Resist" have been corroborated. The Fellowship has also had a productive part in the design of National condensing sections, for which broad patent protection has been secured.

It is planned to describe the investigational results at length in the literature just as soon as all phases of the researches on the Fellowship program are concluded.

Receiver Appointed for Public Service Corporation of Miss.

At the request of the Mercantile National Bank of Dallas, Tex., trustee for bondholders, Allen Bridgeforth of Yazoo, Miss., has been appointed receiver for the Public Service Corporation of Mississippi which serves natural gas from the Jackson field to several South Mississippi municipalities. The receivership was granted by Federal Judge E. R. Holmes at Jackson.

According to petition the utility is in default in payment of interest on the bond mortgage for $800,000. It is alleged also other conditions of the bond contract have not been fulfilled.

The court decree provides for uninterrupted service of the public with natural gas. The company was incorporated April 24, 1931. Frank W. McGehee of Dallas is president and other officers are Harry B. Barnhart and B. V. Kincaid of Dallas.

City Council Rejects Proposal to Mix Natural with Artificial Gas

A proposal by the Northern Indiana Service Corporation to mix natural gas with the present artificial supply at Wabash, Ind., has been rejected by the city council. The company contended the higher heat content of the mixed gas would make an automatic reduction of about 9 per cent in rates. City officials asserted the reduction was not large enough and a committee which investigated at Michigan City reported a majority of users interviewed were opposed to the mixture, contending there was no reduction in monthly bills and the mixed gas caused considerable trouble.

Brooklyn Union Honors Employees

Employees of The Brooklyn Union Gas Company, Brooklyn, N. Y., who have completed a quarter century or more of faithful service or made some notable contribution to efficient operation were honored by the company recently at its ninth annual service emblem dinner. The dinner, which was attended by 600 persons, was held at the Columbus Club, 1 Prospect Park West, on November 9.

The presentations of service emblems, medals and awards were made by Vice Presidents Clifford E. Paige and F. Christopher Weber and Treasurer Herbert Wellington. Mr. Paige addressed those present on the status and problems and progress of the gas industry. Assistant Chief Engineer C. C. Atwood introduced the speaker and those who presented the awards.

A total of 131 employees received service emblems. These emblems denote service of 25, 30, 35, 40, 45 and 50 years. Six emblems were presented to employees completing 50 years of service. The 45-year group contained nine men; the 40-year group, 17; 35-year group, 9; 30-year group, 16, and the 25-year group, 74.

The addition of the 74 persons on the 25-year group to the company's service honor roll of those who have completed a quarter century of service brings the total on the roll to 562. Of this number 394 are still in active service, including President James H. Jourdan who has completed 51 years of service.

Seventeen employees were presented special awards for having made some outstanding contribution in the form of some invention or marked proficiency in

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and even more if necessary, is the operating pressure of a natural gas transmission line over 12 miles long constructed of 6-inch cast iron pipe with mechanical joints. These and other mechanical joints made by members of this Association, while differing in design, are gas-tight under high pressures. Address inquiries to The Cast Iron Pipe Research Association, Thos. F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

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their daily work. Three got awards for inventions, the remaining 14 being honored for special skill in their work. Among the latter were nine indexers who avoided errors in meter reading throughout the year 1932, and five chauffeurs who completed five years without an automobile accident.

"Industrial Uses of Stainless Steel"

"Industrial Uses of Stainless Steel" was the title of a talk delivered before a meeting of the American Society of Mechanical Engineers at Cincinnati, Ohio, November 23, by C. C. Snyder of the Central Alloy Division, Republic Steel Corp., Massillon, Ohio. Prefacing his address with a brief history of the development of stainless steel, Mr. Snyder then divided the present large number of different types of stainless steel into the proper main groups, giving their general characteristics and properties.

The latter part of the talk stressed the rapidly increasing use of stainless steel in various industries, such as building, meat packing, brewing, automotive and the chemical and allied industries. Lantern slides were used to illustrate a number of typical installations of Enduro Stainless Steel.

Indianapolis Utility to Buy Gas Company

The Indiana advisory board of the public works administration has sent to Washington the application of the Indianapolis Utility district to buy the Citizens Gas Co., for $10,191,000. Although there is no definite stipulation in the application to bring natural gas into the city, it is learned on high authority that provisions will be made to make natural gas available. If approval of the petition is granted, it means municipal ownership of the utility. City officials are confident the application will be approved in Washington since it is said few such applications are rejected. The application provides that $6,500,000 preferred stock of the Citizens Gas Co., shall be retired by the City in the purchase.

Louisiana Companies Asked to Install Free Service Pipe

All operating gas companies in Louisiana have been requested by the Louisiana Public Service Commission to adopt a policy of installing service pipe from the property line to the consumer's meter at no cost to the customer. The commission estimates that an average saving of $15 will be made for each new customer. Experimental application of the new policy will be made during October and November by the Louisiana companies.

Company Changes Gas Mixture to 1,000 B.t.u. from 570 B.t.u.

At the request of the Northern Indiana Public Service Company, officials of several cities in the Wabash valley in Indiana have paid visits to Michigan City, Ind., where the company has changed its gas mixture to 1,000 B.t.u. instead of the usual 570 B.t.u. in straight artificial gas. The company proposes to provide similar gas to Peru, Wabash, Logansport, Winamic and Delphi, the latter of which is served by the Indiana Service Corporation, an affiliate of the Northern Indiana company.

Gas Appliances Featured at Hotel Exposition

"News developments" in equipment for hotels and restaurants were featured at the gas and electric exhibits at the 18th National Hotel Exposition, held at Grand Central Palace, New York City, from November 13 to 18.

The general keynote of the gas exhibit was the greater economy and improved operation of modern gas appliances. A center of attraction was a demonstration of the differences between the modern hotel gas range and its predecessor of several years ago.

A modern gas range, with insulated oven and heat control, was placed alongside of a non-insulated range which did not have a control. Recording thermometers and test meters connected to the ranges showed the wide difference in operating results.

In the case of the non-insulated range, an engineer kept the temperature of the oven as close to 500 degrees as he could by constantly watching the thermometer. The charts showed that it took from 35 to 40 minutes to build up the temperature to 500 degrees, and that it was virtually impossible to eliminate wide fluctuations. When the temperature of 500 degrees was reached, the temperature on the outside of the oven was from 250 to 280 degrees, and to cool the oven to 100 degrees required one hour and forty minutes. The gas consumption was checked at 50 cubic feet an hour.

With the other range, the thermostat maintained the 500 degree temperature without attention, and the time to build up the desired temperature was from 30 to 35 minutes. The outside temperature was 150 degrees, some 100 degrees lower than that of the non-insulated range. The gas consumption was 44 per cent less—or 28 cubic feet an hour.

One of the features of this Hotel Show was the large number of gas broilers on display. This was taken as an indication that the public's interest in broiled meats has revived to a marked extent.

The exhibits were designed and constructed under the direction of R. M. Martin, Director of Display, Consolidated Gas Company of New York and its affiliated gas and electric companies.

Brings In Good Gas Well

The Holly Development Company, through its subsidiary the Wyoming-California Petroleum Company brought in a gas well in the South Baxter Basin field of Sweetwater County, Wyoming, making thirty-five million cubic feet of gas. The well is 3,596 feet deep, the gas coming from the Lakota sand.

Stillwater, Okla., Kills Municipal Gas Project

The city commissioners of Stillwater, Okla., by a vote of three to two recently decided against calling a special election to pass upon the question of building a municipal gas distribution system. This action was taken to dispose of petitions presented by proponents of a municipal gas system. Members of the commission voting against the proposition held that petitions were not representative of the taxpayers and the action was accepted as conclusive on the project.

Convention Calendar

February, 1934

8-9 New England Gas Association, annual meeting, Hotel Statler, Boston, Mass. Clark Belden, executive secretary.

March, 1934

6-7 Oklahoma Utilities Association, 16th annual convention. Hotel Mayo, Tulsa, Okla.

June, 1934

4-5 Canadian Gas Association, 27th annual convention, Hotel Windsor, Montreal, Can. George Allen, secretary.

October, 1934

Week of October 29th, American Gas Association 16th annual convention, Atlantic City, N. J. Alexander Forward, managing director.

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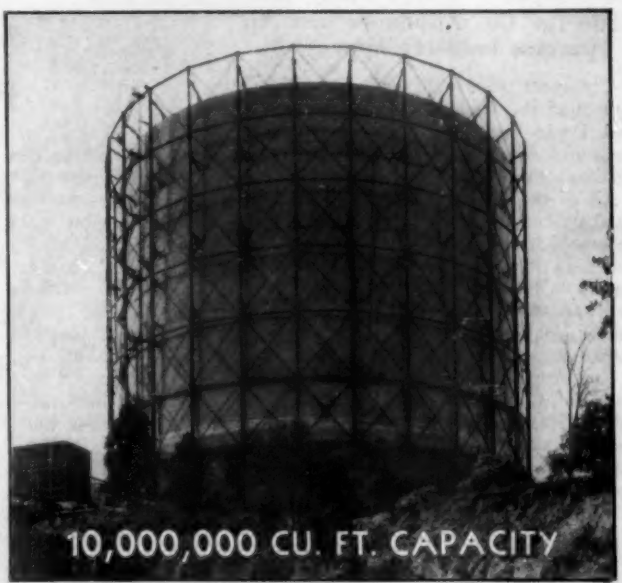

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New Directors Elected

Ellis L. Phillips, president of the Long Island Lighting Co., New York, has announced the election of the following directors to fill unexpired terms: Arthur J. Baldwin, of the law firm of Griggs, Baldwin & Baldwin; Duncan R. Linsley, vice-president of Chase Harris Forbes Corp., and George Link, Jr., of the law firm of McKercher & Link.

Fire Burning in Water New Form of Gas Heating

Fire burning in water may seem incredible but it's the most modern way of heating water by gas. Large gas burners resembling torches are lighted and inserted in the liquid and the gas is made to burn with an intense flame that quickly brings the liquid to a high temperature. It appears that science has created miniature undersea volcanoes, remarks the New Jersey Public Utility Information Commmittee.

With this new process water in wooden tanks can be heated to the boiling point as safely and as readily as in metal tanks. This gas process is not confined to any one liquid. Acids may be heated in this way and solutions in chemical plants that contain large quantities of useless water can be partially dried by boiling off the excess.

Code for Gas Appliance and Apparatus Industry Approved

President Roosevelt, on November 27, approved the Code of Fair Competition and Trade Practices for the Gas Appliance and Apparatus Industry. The code became effective on December 7.

All of the provisions of the code must be complied with in respect to all products which fall within the definition of the Gas Appliance and Apparatus Industry. Through their representatives, the code has been prepared, submitted and approved by members of the following organizations:

Gas Appliances Institute, Gas Range Institute, Gas Space Heater Institute, Gas Water Heater Institute, Gas Boiler, Furnace and Conversion Burner Institute, Gas Apparatus and Accessories Institute and Association of Tank Water Heater Manufacturers.

Sale of Indiana Property of Kentucky Natural Gas Approved

Sale of the Indiana property of the Kentucky Natural Gas Company for $300,000 has been approved by Judge Robert C. Baltzell of Federal court in Indianapolis. The sale was made to Paxton Blair of New York and J. H. Hillman, Jr., of Pittsburgh, Pa., who represent 90 per cent of the stockholders and are planning a reorganization of the company.

Principal Indiana assets consist of 110 miles of pipe line between Tell City and Terre Haute. Assets of the company in Kentucky have been sold for approximately $1,000,000 to the same group. The original suit to foreclose a mortgage was filed by the People's Pittsburgh Trust Company and M. B. Holland, trustee, for holders of $4,500,000 in bonds which were defaulted. The Missouri-Kansas Pipe Line Company the holding firm, and the Indiana-Kentucky Natural Gas Corporation, an auxiliary firm, also were defendants in the suit.

The original sale was held in Terre Haute, Oct. 10 and representatives of the reorganization committee bid only $100,000 for the Indiana assets. The sale was continued, however, because of a disagreement over eligibility of other bidders said to represent New York stockholders. Later other interests increased their bids and the reorganization committee bid was raised to $300,000.

Stockholders Buy In Gas Company

At the public sale, stockholders of the Oklahoma Natural Gas Corporation, the only bidders, bought in their company at the minimum prices set by Federal Judge Franklin E. Kennamer. The purchase price was $500,000. The assets of the company are said to be worth $64,000,000. A. E. Bradshaw, the receiver, will be retained in charge until the reorganization.

Electrolux Refrigerator Featured In "House Of Years"

In the kitchen of the "House of Years," the full-size country house built within the New York, Fifth Avenue shop of W. & J. Sloane & Company, an Electrolux refrigerator shares the admiration of thousands of visitors daily with the hundreds of other household furnishings and up-to-date equipment which have made the Sloane shop a veritable Mecca of shoppers and sightseers since the opening of the house on October 24. As many as 4,000 visitors have passed through the kitchen in one day, according to actual count.

The "House of Years," a two-story building in the Regency style, constructed on a full scale, was designed by a leading firm of architects to embody the latest ideas in utility as well as architectural charm. On its utilitarian side, the "House of Years" has been so equipped that it is an "all-gas" dwelling.

In cooperation with the American Gas Association, the installations include not only the Electrolux refrigerator, but the model gas range in the kitchen, a hot water heater and house heating plant operated by a gas-firing unit, and a gas-fired incinerator.

The "House of Years" is a complete replica of a country house, both exterior and interior, even to gardens in the front and rear with lawns and shrubbery.

Pacific Coast Gas Statistics

Figures for gas company operations, compiled by the Pacific Coast Gas Association, in the states of California, Arizona, Nevada, Oregon and Washington, and the province of British Columbia, for the first nine months of 1933 and the similar period in 1932 are given below:

	1932	1933	Percent Change
Production—Mcf			
Water Gas	2,171,703	1,702,822	
Coal Gas	1,129,755	521,075	
Oil Gas	5,722,163	3,310,758	
Coke Oven Gas	508,585	1,248,108	
Butane Gas—550 Btu	192,044	169,829	
Natural Gas Purchased	96,420,742	107,685,314	
Total	106,144,992	114,637,906	+8.0%
Active Meters—Sept. 30			
Domestic	1,518,951	1,513,111	—0.4%
Commercial and Industrial	69,126	70,763	+2.4%
Total	1,588,077	1,583,874	—0.3%
Sales—Mcf			
Domestic	46,706,376	46,246,409	—1.0%
Commercial and Industrial	35,756,293	41,020,578	+14.7%
Electric Generation	10,131,134	10,679,703	+5.4%
Total	92,593,803	97,946,690	+5.8%
Gross Revenue			
Domestic	44,206,001	43,371,276	—1.9%
Commercial and Industrial	10,515,309	11,111,846	+5.7%
Electric Generation	1,309,539	1,240,988	—5.2%
Total	56,030,849	55,724,110	—0.5%

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"THE EFFICIENT PURIFIER"
High Total Sulphur Absorption at Minimum Cost. Intensely Active.

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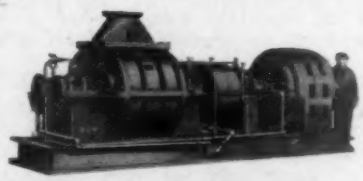
R-C-W BUILDS COMPLETE LINE OF GAS EQUIPMENT



Illustrated above is high inertia gas compressor delivering 750,000 cu. ft. per hour against 12 lbs. pressure, direct motor driven at speed of 588 RPM. This machine is of the Rotary Positive type.

Rotary Positive Boosters and Exhausters have won an enviable reputation in the gas industry on account of efficiency, economy, and durability. R-C-W also builds a complete line of Centrifugal Blowers and Gas Pumps, as well as Rotary, Centrifugal, and Turbine Pumps. During the past two years, the R-C-W Harrison Purging Machine has gained wide recognition among gas men on account of its economical performance and high efficiency. Connersville Rotary Displacement Meters are known for dependable and permanent accuracy.

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Personals

Harry Davis has been transferred from the Crowley, La., office of United Gas Public Service Co., to the office at Jennings, where he will be in charge of sales and service work. W. D. Ellington, formerly in charge of service at Jennings, is now located at the Crowley office.

Frank Budd, formerly district manager of the Minnesota Northern Natural Gas Co., at Rochester, Minn., has been appointed sales manager of the Sonner Burner Co., with headquarters at Winfield, Kans. He comes to this post from three years' service with the Northern Natural interests, being at one time assistant to the general manager of Northern Gas and Pipe Line Company at Omaha.

From 1918 to 1930 Mr. Budd was associated with the Central Indiana Gas Co., at Muncie, Ind. He took an active part in activities of the Indiana Gas Association during this period, being on the executive board of the organization and also secretary and treasurer for four years. At the present time he is a member of the executive board of the Mid-West Gas Association. During his early years of gas experience Mr. Budd was associated for a time with the Spokane Gas and Fuel Co., Spokane, Wash.

L. E. Fischer, formerly vice-president in charge of operations of the North American Light and Power Co., Chicago, has resigned this position to become president of the Northern Natural Gas Co., succeeding William Chamberlain. Mr. Chamberlain has been elected chairman of the board of Northern Natural, and J. F. Mortimer, New York, becomes vice-president in charge of operations of the North American Light and Power.

Mr. Fischer began his engineering career as city engineer for Paris, Ill., going to Danville, Ill., about 1899 with the W. D. McKinley Co., owners of the Illinois Traction System of which he later became manager. He went to St. Louis about 1908 to establish a consulting engineering organization, and later joined the North American Light and Power Co.

H. E. Almberg, attorney, is now actively connected with the law firm of Shearman & Sterling, of 55 Wall Street. He will be associated mainly with all legal work concerning the Consolidated Gas Company of New York, and its affiliated companies, taking over the duties of the late P. F. W. Ruther, who died on October 29.

Mr. Almberg has been head of the Law Department of the Consolidated Gas Company for twenty years, and he will retain his position in addition to his new work with Shearman & Sterling.

He was born in New York City, educated in the public schools, and has lived here most of his life. He is a graduate of New York University and of the New York Law School. He was admitted to the New York Bar in 1906.

He joined the Consolidated Gas Company of New York in 1898, in a secretarial capacity, and entered the Law Department in 1903.

Mr. Almberg is married and has two children. He resides at East Orange, N. J.

N. B. Bertolette, president of The Harrisburg Gas Company, Harrisburg, Pa., was elected president of the Harrisburg Chamber of Commerce at the October meeting of the Board of Directors.

Mr. Bertolette is now serving the Chamber as a director.

T. J. Strickler, vice-president and general manager of the Kansas City Gas Co., Kansas City, Mo., was unanimously elected to serve as vice-president of the Kansas City Chamber of Commerce for the fiscal period 1933-34.

Mr. Strickler held this office formerly and has served for several years on the Board of Directors.

F. H. Holden, supervisor, advertising and publications for the Southern California Gas Co., has resigned this position after an 11-month leave of absence during which he has been acting as secretary-manager of the Printing Trades Association of Los Angeles. He will make his affiliation with the printing industry permanent.

W. M. Couzens, supervisor of the Pacific Coast Branch of the A.G.A. Testing Laboratory, and for the past eight months one of the department heads at the Cleveland Laboratory, recently announced his resignation from the Laboratory which became effective December 1st. He joins the fast growing organization of the Grayson Appliance, Ltd. of Lynwood, California, to become the eastern manager for that firm.

Mr. Couzens began his relationship with the A.G.A. Laboratory as a testing engineer in September, 1926, after graduating from Tri-State College that year. He later worked into the research department, and in 1928 was appointed Chief Inspector. In 1930 he was chosen to organize the first branch Laboratory in Los Angeles which has become a very active center for laboratory service on the west coast. Since last February, when he exchanged positions with Dr. F. E. Vandaveer, he has been located at the Cleveland Laboratory, supervising all research investigations being conducted there.

Dorothy Shank, director of the research kitchen of the American Stove Co., Cleveland, O., has been appointed chairman of the Home Service Committee of the American Gas Association for the coming year.

A. J. Llewellyn, president, Luzerne County Gas & Electric Corporation, was elected president of the Pennsylvania Gas Association at a meeting of the association's council on November 23. He had previously been vice-president. His election as president fills the vacancy caused by the resignation of F. M. Milward Oliver.

T. W. McDonald, of York, second vice-president, and **E. W. Ehmann,** of Ardmore, third vice-president, were advanced to first and second vice-presidents, respectively.

Mr. Llewellyn started with the Luzerne Company in 1901 as a meter reader. He had been collector, bookkeeper, solicitor, lineman and superintendent prior to his appointment, in 1915, as manager of the Kingston division. He became president in April, 1928.

E. N. Strait, of Chicago, Manager of the Rate Department, and Member of the Operating Committee of the Byllesby Engineering and Management Corporation, has accepted the chairmanship of the important Rate Structure Committee of the American Gas Association.

Graduating from the University of Wisconsin, in 1906, Mr. Strait engaged in testing equipment and in 1907 became a member of the staff of the Railroad Commission of Wisconsin. He served with the Commission for a period of about ten years, during which time he was connected with the engineering department, engaged in valuation of public utilities, development of standards of gas and electric service and inspection of service; an investigator of

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Joining the Byllesby organization in 1916, Mr. Strait organized a Department of Rates, Contracts and Operating Results in charge of rate work for the properties comprising the Standard Gas and Electric Company group. This led to his present position as Manager of the Rate Department and Member of the Operating Committee of the Byllesby organization.

The Association's Rate Structure Committee concerns itself with all phases of rate making for the gas industry. With a membership comprising leading rate experts, the Committee has consistently issued reports of great value.

EVALUATING GAS COALS

The importance of the ash content of a gas coal is emphasized, and attention is drawn to the relationship between the volatile matter and the ash in the coal to the ash in the coke. While the proximate analysis is valuable for purposes of control, other tests are often necessary, particularly with new coals or coal blends. These tests include the determination of the caking power, swelling and swelling pressure. For the production of coke of uniform quality it is desirable that the banded constituents should be well distributed. A more complete examination would also include a distillation test, determination of the calorific value, and the ultimate analysis. The swelling properties of the coal are greatly reduced by preheating. Though the presence of oxygen hastens this change, it also occurs if the coal is heated in an inert gas or in a vacuum. Similarly, the swelling properties are influenced by the rate of carbonization.—*Schlaepfer. Monats-Bulletin Schweizer Verein Gas und Wasserfachmaennern, 1932, number 6, 18 pages.*

MEETING PEAK LOAD IN COKE OVEN PLANTS

Peak load conditions are claimed to be met under best conditions by operating a coal-water-gas generator to take care of the increased demand of gas. A generator which can be successfully used for this purpose is described. Any type of gas coal may be used in this apparatus and it is provided with an efficient mechanical agitating device, which prevents the agglomeration of the more strongly caking varieties of coal in the apparatus. The throughput of the generator is large and its operation is reliable. The blast gases are withdrawn from the top of the gasification zone at the circumference of the generator and through a central offtake. This zone is steamed and water gas is formed. The water gas passes up through the carbonization zone of the generator, the mixed water gas and coal gas being passed to storage.— *Pistorius. Brennstoff-Chemie, 1933, volume 14, pages 169 to 170.*

CARBONIZATION OF LIGNITE COAL

Carbonization of lignite coal briquettes can be carried out at a lower temperature than with bituminous coal. The tar is more amenable to cracking, but the gas contains more carbon dioxide and carbon monoxide, less naphthalene and ammonia, more benzene, and in general, from 0.1 to one per cent by volume of sulphuretted hydrogen. The coke—yield is 40 per cent—contains about ten per cent of ash, and as it has a high reactivity it is good water gas fuel. Carbonization in Koppers' vertical chamber ovens, which are fitted with cracking chambers gave a gas (five per cent carbon dioxide basis) of average composition 5.0 per cent carbon dioxide, 3.0 per cent C_nH_m, 0.4 per cent of oxygen, 25.3 per cent of carbon monoxide, 48.5 per cent of hydrogen, 14.5 per cent of methane and 3.3 per cent of nitrogen. The density of the gas is 0.521 and the calorific value is 4285 gram-calories per cubic meter. The yield of benzol was 20.5 to 34.4 cubic centimeters per cubic meter of gas. Gasification of the fine coke in a step-grate generator is described. The gas formed contained 5.0 per cent carbon dioxide, 26.5 per cent of carbon monoxide, 10.0 per cent of hydrogen, 0.5 per cent of methane and 57.9 per cent of nitrogen. The gas had a calorific value of 1173 gram calories per cubic meter. It is necessary to remove the greater part of the carbon dioxide by a sodium carbonate wash before distribution. The ratio of the cost of making gas from lignite coal and from bituminuous coal is estimated to be 1 :1.06.— *R. Heinze. Das Gas und Wasserfach, 1933, volume 76, pages 262 to 267.*

Obituary

ARTHUR FOWLER STANIFORD

Arthur Fowler Staniford, vice-president and director of the Brooklyn Union Gas Co., Brooklyn, N. Y., died unexpectedly at his home in Ridgewood, N. J., on November 11th of heart disease. He was 69 years old.

Mr. Staniford was born in Rockport, Mass., a son of the late Daniel and Caroline Staniford. When he was four years old the family moved to Salem, Mass., and two years later to Brooklyn. He attended Trinity School and at the age of 15 left school to take his first position with a candy manufacturing company.

Two years later he became connected with the Metropolitan Gas Light Co., in Brooklyn, of which he was made secretary in 1885. He was a director of the firm in 1892, when it was consolidated with the other gas light firms to form the Brooklyn Union Gas Co. Five years after the consolidation he was appointed auditor of the Brooklyn Union Gas Co., and since 1910 has been its vice-president and since 1922 a director.

Mr. Staniford was married twice, first to Amanda M. Hutson of Brooklyn, in 1887. There were two children, Robert H. and Arthur F. Jr., by this marriage. Mrs. Staniford died in 1904. In 1915 Mr. Staniford married Beatrice Marter of New York, who survives him. There were four children of this marriage: Richard M., Edward F., Philip S., and Barbara Louise.

ISMAR GINSBERG

Ismar Ginsberg, of 554 Grassmere Avenue, Far Rockaway, Queens, a chemical engineer with offices at 33 West Forty-second Street, died of a heart attack on Friday night, Nov. 24th, at the Broadmoore Hotel, where he was spending the Winter. His age was forty-three. Born in New York, son of Abraham Ginsberg, he was graduated from Columbia University in 1911 and from the Columbia School of Mines in 1915.

Mr. Ginsberg was not only a frequent contributor of scientific and technical articles to *American Gas Journal* and other publications, but also served as editor of *American Gas Journal* from 1923 until 1927.

He is survived by his widow, the former Miss Helen Tennenheiser; his father, a brother, Elias Ginsberg, and two sisters, Mrs. Cleo Jackson and Miss Ethel Ginsberg.

JOHN A. BROKAW

John A. Brokaw, 49, who was for a number of years chief engineer for the Lone Star Gas Company of Texas, died at his home in Wheatridge, just outside of Denver, Colorado, November 26 of acute indigestion. He was a native of Mitchell, South Dakota. His widow survives him.

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TRADE NEWS

Direct Mail Advertising Association Grants Award To Electrolux For Effective Advertising Methods

Electrolux Refrigerator Sales, Inc., is a winner for the third consecutive year of an award granted annually by the Direct Mail Advertising Association to fifty firms for the most effective methods used in direct mail advertising, it was announced recently. Electrolux Refrigerator Sales, Inc., was responsible for distribution during 1933 of 12,500,000 separate pieces of advertising matter through the mails as a supplement to its newspaper and magazine advertising, the announcement stated.

The 1933 award to Electrolux Refrigerator Sales, Inc., was made during the recent annual convention of the Direct Mail Advertising Association held in Chicago.

Electrolux Refrigerator Sales, Inc., and the other forty-nine firms who received the 1933 award are selected from thousands of firms throughout the country who submit samples of their advertising literature and other information regarding their selling campaign methods through the use of the mails to the Direct Mail Advertising Association.

New FauceHot Representation

The Gas and Electric Heater Co., LaPorte, Indiana, and the Sonner Burner Co., Winfield, Kansas, announce the completion of an arrangement whereby the following Sonner Burner Co. men will also handle the sale of FauceHot and Gem Gas Water Heaters in their respective territories.

E. A. Brown, 627 40th St., DesMoines, Iowa; K. D. Goodwin, Shurtleff Arms Apts., Lincoln, Nebraska; J. S. Stover, Box 252, Rochester, Minn.; C. W. Robbins, c/o Sonner Burner Co., Room 547, 122 So. Michigan Ave., Chicago, Ill.

A New Catalog on Flexible Couplings

A new illustrated catalog has been completed by Link-Belt Company, 519 N. Holmes Ave., Indianapolis, on flexible shaft-couplings. Three different types are tabulated and priced, with special emphasis on type "RC" which employs Link-Belt Silverlink Roller Chain for flexibly connecting the two toothed coupling halves. Both revolving and stationary type of automatic-lubricating castings are included.

The selection of the right coupling for the work is made easy by a series of conveniently arranged tables. A copy of the new book is available to anyone requesting it on business letterhead.

Research Laboratories Moved From New York To Evansville

Removal of Electrolux refrigerator laboratories and research activity from New York City to the Evansville, Indiana manufacturing plant was announced recently at eastern headquarters, 51 East 42nd Street by F. E. Sellman, vice-president of the company. Mr. Sellman explained that the 1934 development program, already under way, necessitated concentration of scientific research inasmuch as it is expected the new year will call for increased production and wider distribution of the new air-cooled models.

"Increased sales during 1933 and the encouraging outlook for next year pointed to the need for bringing out the constantly widening research program closer to plant and distribution centers," Mr. Sellman said.

The Electrolux laboratories were formerly located at 408 East 111th Street, New York City, where most of the outstanding improvements were devised. Much of the testing, however, was carried on in the engineering department at the Evansville plant. Under the new plan the research and testing work will be coordinated at Evansville.

The laboratories are staffed by thirty research engineers and technical experts under the direction of Dr. William R. Hainsworth who received the 1933 Charles A. Monroe Award granted annually by the American Gas Association for outstanding achievement in the gas industry. The award was given to Dr. Hainsworth for his perfection of the air-cooling principle now embodied in Electrolux models.

Gibson Company of Indiana Demonstrates New Norge Broilator

More than 300 restaurant and hotel men, hospital dietitians and gas company representatives from a wide surrounding area recently attended a very successful two-day demonstration of the new Norge Broilator stove at the Gibson building in Indianapolis, as guests of the Gibson Company, distributors in Indiana for the Norge organization. E. C. Parker of the Norge Corporation, Detroit, and Jerry Stedman of the Cramer-Krasselt Company, Norge advertising agency, assisted E. M. Stevens, manager of the specialties division of the Gibson Company in the demonstration.

Gas Company Statistics For September 1933

Sales of manufactured and natural gas aggregated 86,416,800,000 cubic feet in September, an increase of nearly 7 per cent over the corresponding month of the preceding year.

In spite of augmented sales, however, revenues continued to lag, income for September amounting to $48,800,000 as compared with $49,874,100 in September a year ago, a decline of 2.2 per cent.

Most of the sales expansion of the industry was the result of pronounced increases in gas sales for industrial-commercial purposes, which averaged 14 per cent above the figures for September a year ago. Revenues from this class of business also gained, although not in proportion to increased volume, amounting to $14,532,900 in September as compared with $13,706,200 for the same month of the preceding year, an increase of 6 per cent.

While sales of manufactured gas for domestic cooking, water heating, refrigeration, etc. continued to run about 6 per cent below a year ago, sales for house heating purposes registered a sharp gain, amounting to more than 22 per cent over the preceding year. Manufactured gas sales for industrial-commercial uses were also above those of a year ago by nearly 12 per cent.

Natural gas sales for domestic uses during September about equalled those of a year ago, while sales to ordinary industrial customers were up 12 per cent. Sales to large scale industrial users of natural gas showed a gain of nearly 25 per cent over the same month of the preceding year.—*Paul Ryan, Statistician, A.G.A.*

A Symbol

THE Yule log—symbol of Christmas through the ages. On the great holiday the lord of the manor threw wide the doors, and misery and squalor were forgotten in the cheer of the boar's head and wassail.

Customs change, but the Christmas spirit is ageless. Today millions express it by the purchase of Christmas Seals—the penny stickers that fight tuberculosis—still the greatest public health problem. Your pennies will help.

BUY CHRISTMAS SEALS

Diaphragms

(Continued from page 33)

leather on the market, this additional expense is justified, and the leather so produced is perfect for the purpose.

The skins are sorted in the tannery by inspecting them singly. The idea of firmness is obtained by folding the skin across the shoulders and pulling the fold between the thumb and forefinger of the right hand. In this way the resistance of the skin to sharp folding gives an idea of the firmness of the skin. However, the method requires a considerable amount of experience and even an experienced tester is apt to be misled if a batch of skins tends to run from one firmness to another gradually. For this reason, it is often customary to make a quick inspection of the first and last skins tested to see that the standard has not been changed during the testing.

Some idea of the thickness of the skin can be obtained by an experienced inspector when testing the skins for firmness, but it is common to use special gauges reading in tenths of millimeters.

The skins are measured on special machines which record the area of each skin in square feet; one-fourth of a square foot being the smallest unit recorded. The principle of the machine is that a number of wheels approximately ¾ in. apart are mounted just above a rotating roll. When the skin passes over the roll, its thickness is sufficient to make contact with the wheels, which are thus caused to rotate. The amount of rotation of each wheel is integrated on a single dial, from which the reading of the total area of the skin is read. Naturally, such a machine measures every part of the skin even though a good many parts, such as the ends of the legs and parts of the belly, are not useful for meter diaphragms. The thinner skins run from 0.7 to 1.0 mm. in thickness, while the larger ones run up sometimes to as much as 2.0 mm.

(Continued in January issue)

1933 Meets 1849

(Continued from page 8)

board, the architect and the engineers.

More than 800 pupils formed the classes which occupied the school for the first time this fall. Some of the younger children could scarcely pronounce the resounding name of the new structure, although all knew it was named for an outstanding Spanish general who gave the city its name—General Mariano Guadalupe Vallejo. The school bears his full title, plus the three added words, Junior High School. Quite a mouthful!

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New Ideas In Regulation

AFTER briefly tracing the history of the development of state commissions for regulating utilities and other similar industries, Mr. H. Lester Hooker, President, National Association of Railroad and Utilities Commission of Virginia, in his paper, "A New Concept in Utility Regulation," said that "in the light of the present public clamor what are fair rates? It is, of course, extremely difficult to condense the countless expressions of public opinion into a concrete definition of what the masses consider is a fair rate for a utility service. Probably the statement that comes nearest to expressing the idea in the minds of the public today is about as follows:

"A fair rate, Mr. Average Man would say, is one which for a community or a section compares favorably with rates for similar service in similarly situated communities, and at the same time allows the company under good management and without extravagant overhead to make a sufficient profit to attract the investment of new capital when needed in the enterprise.

"This public definition, to be sure, is not identical with the technically phrased definitions of fair rates laid down by the courts in numerous cases. But, by how much does it differ in principle from the fundamental thought upon which the court dicta are based? The public, as a whole, it may truly be said, is fair minded in the last analysis. The most outspoken critics of prevailing rates may be determined to wreck the utilities, perhaps. The general public, however, I sincerely believe is willing to 'live and let live'; it is willing to pay rates for the utility services it consumes sufficient, under normal conditions, to cover the operating expenses, taxes, and a fair return on the fair value of the property of the public service corporation rendering the service. Is this not the same principle which permeates all judicial rulings as to the determination of fair rates?

"If, then, heed is to be given to the public's definition of fair rates, the determination of rates for utility services will take a somewhat different course from the more or less standard practice in the past. If the state regulatory commissions are not to wholly disregard the public clamor and to refuse to interpret the manner in which they are determining the fairness of the rates the average man pays, the formal, rigid, legal processes of the past must be modified. An old adage is to the effect that the dislike of an individual is due to the lack of acquaintanceship. The same is true of utility regulation. The public distrust of the fairness of prevailing rates is due, in large part, to the fact that the public is wholly unacquainted with the methods by which the commission must work and the reasons upon which the commissions arrive at their decisions.

"To acquaint the public with the facts of the case, the facts, which if made clear to the ratepayers, will satisfy many of the complaints they now raise, the old processes by which rates have been determined are largely inadequate. By the old processes of rate cases, the several methods of arriving at the present value of the used and useful plant are employed, and various values of physical property are presented by engineers and accountants, and after this is determined, various overheads are allowed to arrive at the present value of the physical plant. The generally fixed charges are determined, such as operating costs, taxes, depreciation, etc., and a rate fixed that will pay these and, in addition, show a net return or profit to the stockholders.

"This process is still useful, but the public has become dissatisfied with only this. In many cases, it does not answer the question in the public mind in the matter of variations in rates between nearby places. It does not answer the question raised by the public as to whether the physical plant installed is intelligently planned or is the most efficient plant available, nor does it answer the public question as to whether or not the company is efficiently managed.

"The public apparently does not intend to pay a rate based on plant valuations where the plant is not modern or is not efficient. The public does not intend to pay a rate that is higher than neighboring rates because of inefficient or excessively costly management.

"The investigation of rates today, it seems, must not only deal with the actual determination of fair rates, but, in addition, it must be so designed as to interpret to the public why the rates fixed are fair and how their fairness has been determined.

"It may be too radical a statement to say that on this type of investigation rests the future of privately owned public utilities, and yet, strange economic changes are taking place in this country almost overnight. It may be, if the commissions in the various states do not interpret their findings to the general public in an adequate way, that, in many localities, experiments will be started in publicly owned plants that will destroy literally millions of dollars of useful property that does not serve the public as economically as will the publicly owned plants. This type of competition, under a system of proper regulation, destroys useful property and is pure economic waste."

This paper also dealt with the difficulty in properly informing the public as to the facts, and the trouble in getting a rate hearing terminated in a short space of time. He also noted that the public does not understand why rate cases are so expensive.

"In conclusion," said Mr. Hooker, "I wish to assert that it is the business of government to provide an open road for the exercise of the individual initiative of its citizens, not to substitute its own activities for that initiative, and to see that free opportunity is given for the economic production of wealth, not to produce wealth itself. That government is the wisest which does not attempt to perform those functions which more localized agencies, governmental or otherwise, can perform for themselves. It is the business of the government to regulate and control, not to manage and operate. All business needs a lifting purpose greater than the struggle of materialism, but this does not lie in some visionary and emotional crusade. It lies in the higher pitch of economic life and a finer regard for the rights of others, through the organization of all the tools of our economic life so that they may produce happier individual lives, more secure in employment, wider in possibilities of comfort and enjoyment, and larger in the possibilities of intellectual life."

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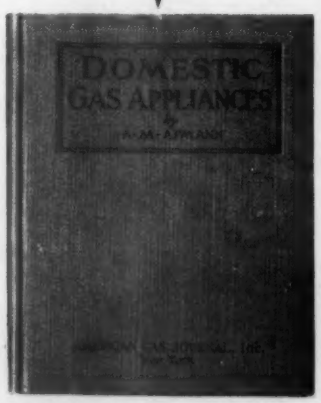

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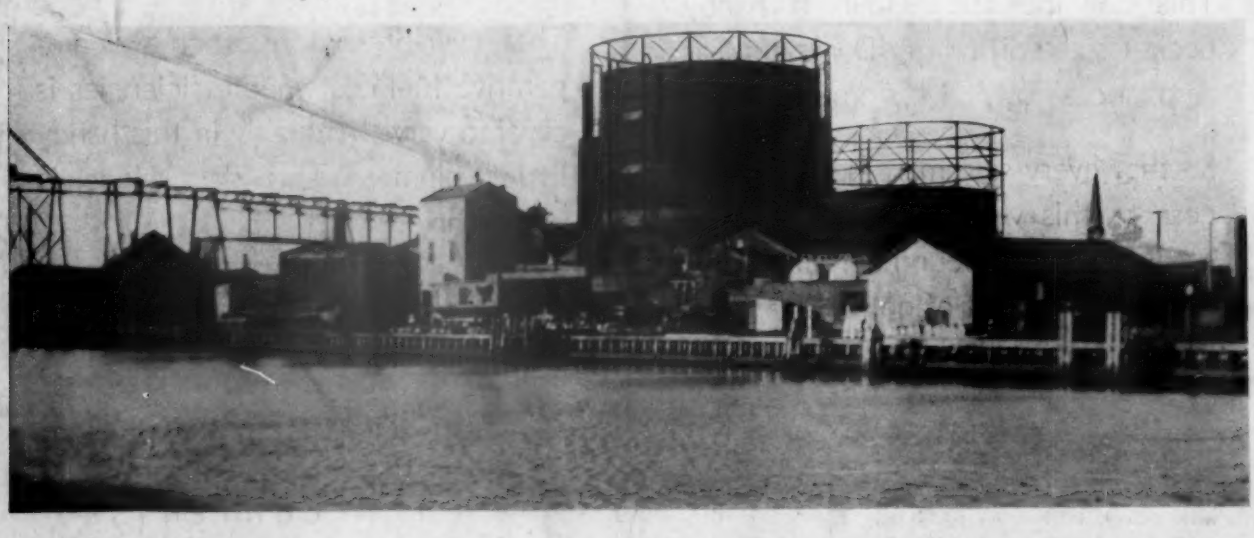

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